MODEL

M100F25

FLOTROL

RECTIFIER

Spec. No. 5274-010 Serial No. _____

THIS FLOTROL RECTIFIER IS ADJUSTED

TO _____ VOLTS. _____ VOLTS PER CELL

FOR A _____ CELL BATTERY. INPUT _____ VAC

OPTIONAL WIRING OR APPARATUS FURNISHED:

A, B, E, G, H, J, K, M, N, Q, R, S, T, V, W, X, Y, Z,

OTHER _____

LORAIN PRODUCTS CORPORATION

1122 F STREET LORAIN, OHIO

PRINTED IN U.S.A.

LORAIN PRODUCTS CORPORATION WARRANTY

Lorain Products Corporation warrants that all equipment manufactured by it shall be free from defects in material and workmanship. The corporation will, at its option, replace or repair free of charge and pay surface carrier charges on any adequately packed equipment covered by its warranty which shall be returned to the factory within 90 days from date of turn-on and found to be defective. All circuit components are warranted for two years from the original shipping date from the factory and which upon examination prove to be defective in material or workmanship. The corporation recommends that all shipments of equipment be inspected by the customer for hidden damage upon receipt from the carrier to insure that a timely claim be filed, if necessary, by the customer. Lorain Products Corporation will not pay claims for shipping damages.

Systems and Equipment Not Economically Returnable To The Factory

In the event that the product involved is a system or equipment which, in the judgment of Lorain Products Corporation, is not economically returnable to the factory or if Lorain Products Corporation has performed the installation, supervised the installation, or performed testing and turn-on, circuit components and Lorain repair labor are covered by this warranty for the first 90 days from date of turn-on and circuit components are warranted for two years from the date of shipment. Upon request, Lorain will send a service technician to the site to determine if the unit is defective in circuit components or workmanship, and will repair the equipment. If the failure is Lorain's fault, no invoice for circuit components or repair labor will be issued if the complaint has been issued within the first 90 days from date of turn-on. If the complaint is issued more than 90 days from the date of turn-on but within two years from the date of shipment, the customer will be billed at the prevailing Customer Service rates but will not be billed for circuit components. If the problem occurs after two years from the date of shipment, circuit components and repair labor are billable.

If the problem has been created by misuse or abuse of the equipment or by malfunction of associated equipment or by environmental conditions, at any time after shipment, the customer will be billed for circuit components and labor.

General Provisions

Lorain Products Corporation shall not be obligated to pay any costs or charges incurred by the customer or by any other party. In no event will Lorain Products Corporation be liable for consequential damages. No waiver, alteration or modification of any of the provisions herein shall be binding on Lorain Products Corporation unless in writing and signed by an authorized official of Lorain Products Corporation. If, during any warranty period, the subject equipment has, in the opinion of Lorain Products Corporation, been modified or misrepaired, the warranty will be void unless the modifications or repairs have been made after consultation with the corporation and upon the recommendation of the corporation.

1. SPECIFICATION

1.1 GENERAL: This FLOTROL Rectifier is used to charge batteries.

1.2 OUTPUT RATINGS

1.2.1 Voltage: Adjustable from 21 to 27 volts for floating from 10 to 12 cells of lead-acid battery. A float-equalize switch and equalize voltage adjustment rheostat provide equalize voltage up to 2.35 volts per cell.

1.2.2 Regulation: Steady state output voltage remains within ± 1/2% of any voltage within the range of 2.1 to 2.25 volts per cell for any load current from no load to full load and for input voltage and frequency specified below.

1.2.3 Filtering: The output noise is less than 25 millivolts when connected to a 400 ampere-hour battery.

1.2.4 Current: 100 amperes, full load

1.3 INPUT RATINGS

1.3.1 Voltage: Nominal 120/240 volts, single phase, 47 to 63 Hz, within the ranges of 95-125 and 190-250 volts.

1.3.2 Typical Input Data

(A) At 26 Volts D-C Output

VOLTAGE AND TAP	AMOUNT OF LOAD	AMPERES	WATTS	VAR	VA	EFFICIENCY
115	No Load	0.7	30	75	81	-
	Half Load	21.0	1550	1850	2415	84%
	Full Load	38.5	3100	3160	4428	84%

Power Factor: Varies between 65% with 250 volt input to 80% with 190 volt input on 230 volt tap at full load while floating 10 cells.

1.4 STANDARD FEATURES

1.4.1 Rectification System: Silicon rectifiers with voltage controlled by thyristors.

1.4.2 Input Protection: One 60 ampere circuit breaker for 120 volt input opens one side of line and one 30 ampere circuit breaker for 240 volt input opens both lines.

1.4.3 Output Protection

(A) Current Limiting: Circuit limits D-C output current to approximately 110% of rated full load under normal overload condition or short circuit.

(B) Short Circuit: One 150 ampere Bussmann Type ACK fuse in negative output lead.

(C) High Voltage Shut Down: Rectifier output power is reduced to zero if output voltage exceeds a preset value, factory set at 30 volts unless otherwise specified. Refer to paragraph 1.4.7 (C).

1.4.4 Remote Voltage Sensing: Provision is made for point of regulation to be extended to battery or power board terminals.

1.4.5 Meters

(A) 0-30 volt, 3 1/2 inch, rectangular type D-C voltmeter, ± 2% accuracy, Triplett 320G (or equivalent), 3.16 inch scale length

(B) 0-150 ampere, 3 1/2 inch, rectangular type D-C ammeter, ± 2% accuracy, Triplett 320G (or equivalent), 3.16 inch scale length

1.4.6 Mounting: Angles provided for 19 or 23 inch relay rack mounting. Additional mountings are available - see Accessories, paragraph 1.6.5.

1. SPECIFICATION

1.4 STANDARD FEATURES (CONT'D)

1.4.7 Alarms
- (A) Operation of the A-C Control fuse causes the output power to be reduced to zero, one alarm circuit to close, one alarm circuit to open and a blown fuse indicator lamp to light.
- (B) If the A-C input current fails or the rectifier is manually turned off, a circuit is furnished which causes one alarm circuit to close and one alarm circuit to open.
- (C) Operation of the High Voltage Shut Down circuit or either of two accessory alarm assemblies cause alarm circuits to open and alarm circuits to close (refer to paragraph 1.6.4).

1.4.8 Load Sharing Circuit: A circuit is provided to obtain proportional division of load with other similarly equipped FLOTROL Rectifiers.

1.4.9 Manual Output Voltage Regulation: Provision is made for turning off the automatic voltage regulation and manually adjusting the output voltage for a given load and input voltage condition.

1.5 ENVIRONMENTAL RATINGS

1.5.1 Operating Ambient Temperature Range: -20°C to +50°C (-4°F to +122°F)

1.5.2 Storage Temperature Range: -40°C to +85°C (-40°F to +185°F)

1.5.3 Heat Dissipation: 2045 BTU/HR

1.5.4 Ventilation Requirements: In mounted position, the unit should be located so that ventilating openings are not blocked and air entering cabinet does not exceed +50°C (+122°F). It may be necessary to allow 5 1/4 inches space and use a heat deflecting baffle plate between this unit and other heat producing equipment.

1.6 ACCESSORIES AVAILABLE BUT NOT INCLUDED WITH THE STANDARD MODEL

1.6.1 Remote Control (shown on schematic diagram as "Y" Option) operates from 48 volt D-C:
(1) Part No. 2561-033

1.6.2 Equalize Charge Timer (shown on schematic diagram as "X" Option), up to 24 hour:
(1) Part No. 2544-452

1.6.3 Battery Eliminator Filter, internally mounted (shown on schematic diagram as "K" Option) reduces output noise to less than 32 dbrn, C-message, without battery: (1) Part No. 4826-083

1.6.4 Alarm assemblies - Choice of either of the following assemblies which will cause two alarm circuits to close, two alarm circuits to open and a front panel RECT FAIL lamp to light.
- (A) Charge Failure Alarm (shown on the schematic diagram as "S" Option. Refer to paragraph 4.9.):
  (1) Part No. 4846-096
- (B) High and Low Voltage Alarm (shown on the schematic diagram as "N" Option. Refer to paragraph 4.10.
  (1) Part No. 4863-012

1.6.5 Mountings
- (A) Mounting angle for 30 inch Unistrut relay rack (requires 19 inch rack space):
  (2) Part No. 3634-428
- (B) Floor Stand (replaces relay rack angles): (1) Part No. 4121-015
- (C) Baffle Plate (deflects heat from FLOTROL Rectifier): (1) Part No. 4133-021 (19" rack) or
  (1) Part No. 4133-022 (23" rack)

1.7 MISCELLANEOUS

1.7.1 Schematic Diagram: SD5274-010

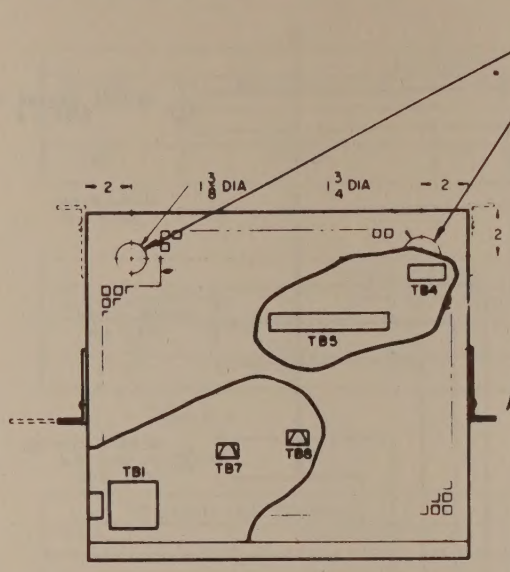
1.7.2 Wiring Diagram: T5274-010

1.7.3 Instructions: Form 2378 and 2376

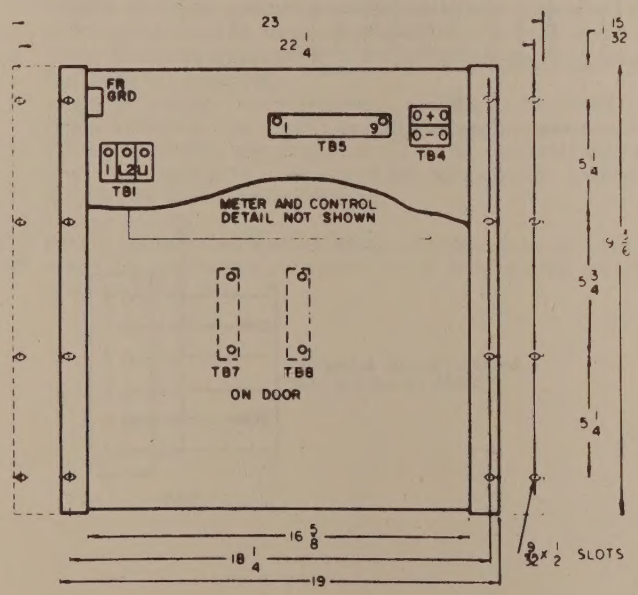
1.7.4 Performance Curves
- (A) Input Amps/Output Amps:
- (B) Output Volts/Output Amps:
- (C) Power Factor/Output Amps:
- (D) Efficiency/Output Amps:

1.7.5 Photographs:

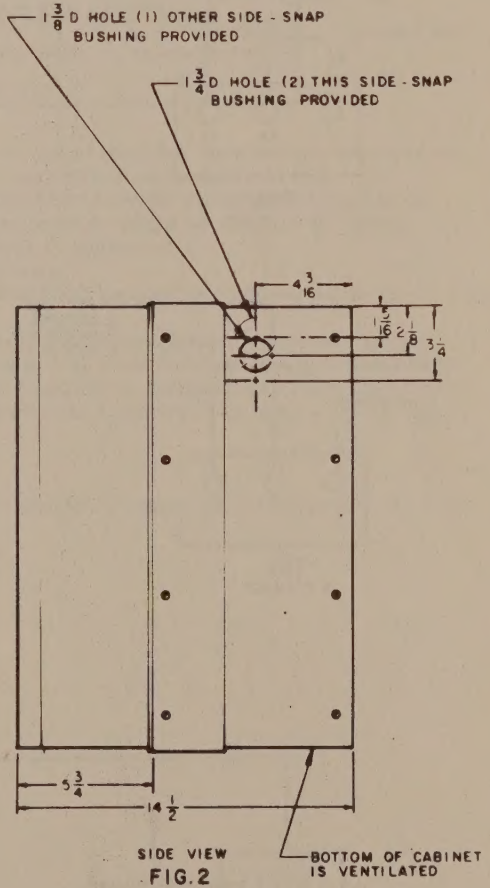
2. DIMENSIONS



TOP VIEW
FIG. 3

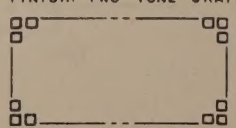


FRONT VIEW
FIG. 1


1 3/8 D HOLE (1) OTHER SIDE - SNAP BUSHING PROVIDED
1 3/4 D HOLE (2) THIS SIDE - SNAP BUSHING PROVIDED
4 3/16
1 5/16
2 1/8
3 1/4
5 3/4
14 1/2
BOTTOM OF CABINET IS VENTILATED

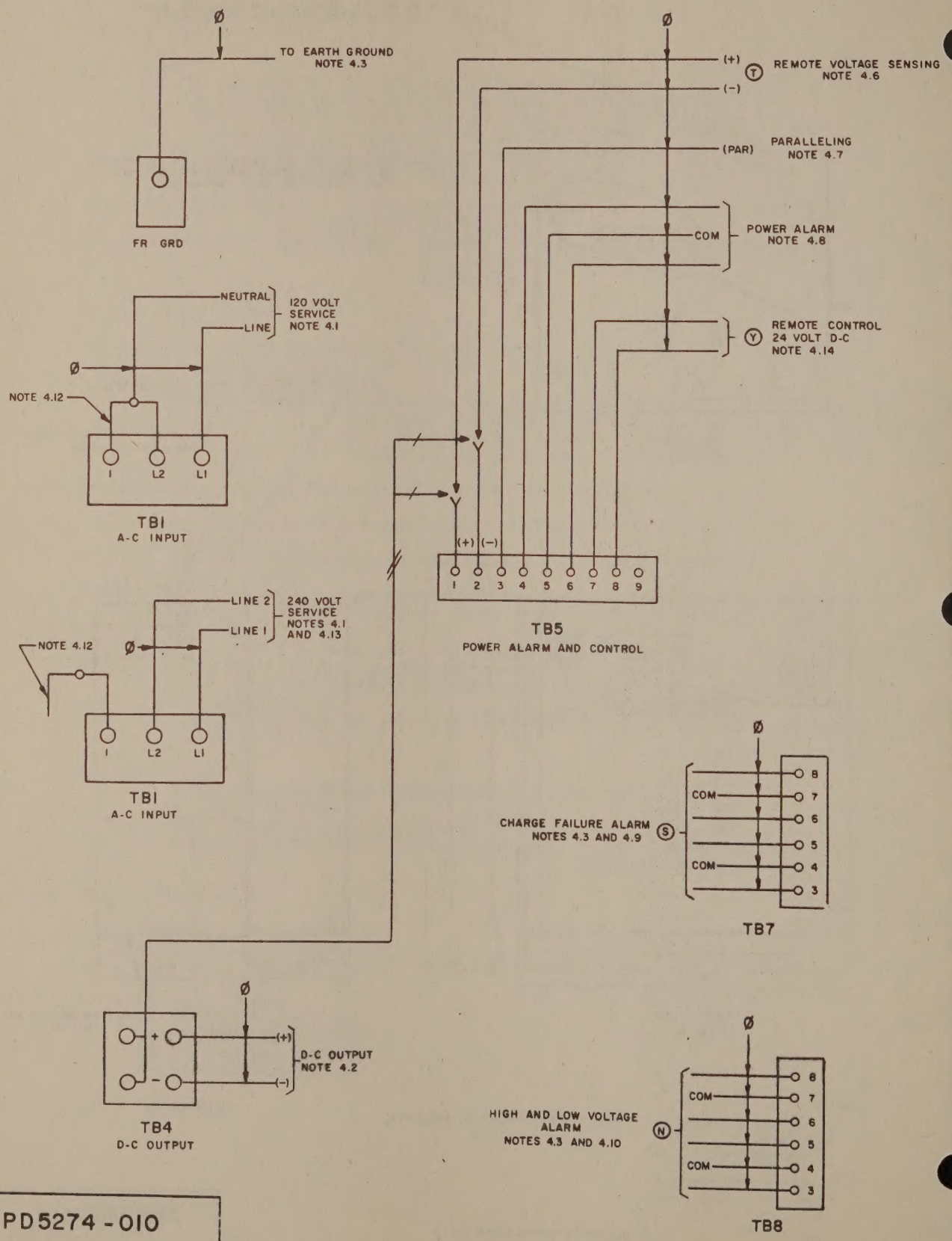
SIDE VIEW
FIG. 2

NOTES

1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
2. WEIGHTS
   (A) SHIPPING: LBS
   (B) NET: LBS
3. FINISH: TWO TONE GRAY.
4.  INDICATES VENTILATING GRILL

PD5274-010		
ISSUE 1	ECN	PAGE 3 OF 5

3. INSTALLER'S CONNECTIONS - READ THE INSTRUCTION BOOK FOR INSTALLATION DETAILS



4. INSTALLER'S INFORMATION NOTES

4.1

A-C INPUT			
Voltage	Recm Wire Size	Recm Fusing	Term. Cap.
120	6 Ga.	(1) 60 Amp	18-4 Ga.
240	10 Ga.	(2) 30 Amp	

4.2

D-C OUTPUT		
Loop Length*-Ft	Recm Wire Size	Term. Cap.
50	2/0	6 Ga. -250MCM
100	2/0	

*-Note 4.4

4.3

GROUND AND NEUTRAL		ALARM AND CONTROL	
Term. Cap.	Recm Wire Size	Term. Cap.	Recm Wire Size
6-14 Ga.	8 Ga.	14 Ga. Max.	18 Ga.

4.4 D-C output wire size sufficient to restrict voltage drop to 1 volt or less at rated full load output current for the loop lengths shown. The loop length is the sum of the lengths of the positive and negative leads.

4.5 Wire sizes meet those recommended in National Electric Code Table 310-12 for 60°C conductor temperature.

4.6 Provision is made to extend remote voltage sensing leads to battery or power board terminals, "T" Option. Unless otherwise specified, leads are factory-connected to D-C Output terminals.

4.7 Connect this lead to paralleling terminal on similar FLOTROL Rectifiers.

4.8 Power failure is indicated by a closed circuit between terminals 4 to 5 and an open circuit between terminals 5 to 6 of terminal block TB5.

4.9 When "S" Option, see paragraph 1.6.4 (A), is furnished, an alarm condition is indicated by closed circuits between terminals 4 to 5 and 7 to 8 and open circuits between terminals 3 to 4 and 6 to 7 of terminal block TB7.

4.10 When "N" option, see paragraph 1.6.4 (B), is furnished, an alarm condition is indicated by closed circuits between terminals 4 to 5 and 7 to 8 and open circuits between terminals 3 to 4 and 6 to 7 of terminal block TB8.

4.11 ø indicates leads run by installer.

4.12 Copper bus bar

4.13 Do not connect A-C Neutral when 240 volt service is used.

4.14 When "Y" option (see paragraph 1.6.1) is furnished, 24 volts D-C should be connected to terminals 7 and 8 of terminal block TB5.

GENERAL INSTRUCTIONS FOR LARGE SINGLE PHASE 25 VOLT "M" SERIES FLOTROL RECTIFIERS

TABLE OF CONTENTS

		Page
1.	MODEL DATA	
a.	Ratings	1
b.	Dimensions	1
c.	Input Voltage Range	1
d.	Output Lead Size	1
e.	Input Lead Size	1
f.	Fuse Types and Sizes	2
g.	Factory Adjustment Settings	2
2.	DESCRIPTION	
a.	General	3
b.	Accessories	3
3.	INSTALLATION	
a.	Location	4
b.	Mounting	4
c.	Preliminary Adjustment	4
d.	Electrical Lead Entrance Options	5
e.	Output Lead Requirements	5
f.	Electrical Connections	5
g.	Control Connections	6
h.	Installation Check	8
4.	ADJUSTMENTS	
a.	General	9
b.	Input Voltage Adjustment	9
c.	Battery Float Voltage	9
d.	Charge-Equalize Voltage	10
e.	Rectifier Load Sharing	10
f.	Equalize Charge Timer	10
g.	Output Current Limit	10
h.	High Voltage Shutdown Circuit Adjustment	10
i.	Accessory High-Low Voltage Alarm Assembly Adjustment	11
j.	Manufacturer Adjustments	13

TABLE OF CONTENTS (CONT'D)

Page

5. OPERATION

a. General 13
b. Starting and Stopping 13
c. Recharge, Equalize Charge 14
d. Accessory Equalize Charge Timer 14
e. End Cell Charging 14
f. Manual Output Voltage Regulation 15
g. High Voltage Shutdown 15
h. Alarm Indications 17
i. Circuit Breakers, Fuses 17
j. Component Boards 17

6. CIRCUIT DESCRIPTION

a. General 18
b. Thyristor Circuit 18
c. Power Supply 20
d. Firing Circuit 20
e. Saturable Reactor L4 20
f. Voltage Regulator Circuit 20
g. Current Sensing Circuit 21
h. Load Sharing Circuit 21
i. High Voltage Shutdown Circuit 22
j. Disconnect Relay 22
k. Accessory Alarm Circuits 22

INSTRUCTIONS
MODEL M100F25 FLOTROL RECTIFIER
SD-5274-010

1. MODEL M100F25 DATA

a. Ratings

Input: 115/230 volts, 50 or 60 Hz, single-phase a-c; 40/20 amperes

Output: nominal 25 volts d-c, adjustable from 21-28 volts for floating 10-12 lead-acid battery cells; 100 amperes

b. Dimensions

Height, 19-3/16 inches; width, exclusive of mounting angles, 16-5/8 inches; depth, 14-1/2 inches; when relay rack mounted, the FLOTROL Rectifier cabinet extends approximately 5-3/4 inches to the front of the rack.

Universal brackets are provided for either nineteen or twenty-three inch relay rack mounting. Unless otherwise specified, these brackets are positioned for nineteen inch relay rack mounting. If desired, these brackets can be repositioned for twenty-three inch relay rack mounting.

c. Input Voltage Range

To adjust for either nominal 115 or 230 volt a-c service, select required input voltage range setting by connection of terminal links between terminals of terminal board TB2 as follows:

Input Voltage Range	Adjustment Connection
95-125	A to B, C to D
190-250	B to C

d. Output Lead Size

Output lead size listed on the wiring diagram or on the power data sheet will limit voltage drop of output leads to less than 1.0 volt so long as output loop length does not exceed maximum specified above each wire size.

e. Input Lead Size

Refer to the wiring diagram or power data sheet for recommended a-c branch circuit fusing, input lead size, and input terminal lug capacity.

1. f. Fuse Types and Sizes

If necessary to replace any fuse, replace only with fuse type and size as follows, or equivalent:

F1: Bussmann Type MDL, 1/2 ampere

F3: Bussmann Type ACK, 150 ampere

g. Factory Adjustment Settings

Unless otherwise specified, this FLOTROL Rectifier is factory adjusted to float charge a 11 cell battery at 2.17 volts per cell, and operate from 190 to 250 volts a-c.

GENERAL INSTRUCTIONS
FOR LARGE SINGLE-PHASE 25 VOLT
"M" SERIES FLOTROL RECTIFIERS

2. DESCRIPTION

a. General

This FLOTROL Rectifier changes standard a-c power to direct current of suitable voltage to maintain a 10, 11 or 12 cell battery in fully charged condition.

An input voltage range adjustment adapts this FLOTROL Rectifier to 95-125 volt, or 190-250 volt a-c input. This permits the FLOTROL Rectifier to be operated from either nominal 115 volt or nominal 230 volt a-c power.

This unit will maintain the steady state d-c output voltage within ± 1/2% for any load from no load to full load, for any input voltage within the input voltage range selected and for input frequency variation between 47-63 hertz.

Filtering is provided to reduce output ripple to 25MV on battery of ampere-hour rating of at least four times the current rating of the rectifier.

When a-c power failure causes battery discharge, or in event of d-c overload, an output current limiter prevents increase of FLOTROL Rectifier output current above a value between approximately 100% and 125% of full load.

If higher d-c voltage is required to recharge battery cells after battery discharge, or to equalize the charge of all battery cells, a switch can be thrown to obtain higher recharge or equalize charge voltage. This voltage is adjustable separately from, and it does not affect the setting of, battery float voltage.

A high-voltage shutdown circuit will turn off the rectifier when output voltage reaches a predetermined adjustable value.

This FLOTROL Rectifier is equipped with a load sharing circuit which enables it to share the load in proportion to the output current ratings with any other "M" Series 25 volt FLOTROL Rectifier equipped with a compatible circuit.

b. Accessories

Special accessories are factory-installed when specified and those marked * are available for customer installation:

2. b. (1) A battery eliminator filter can be provided in addition to the filter mentioned above to reduce the output ripple to 25MV without a battery.

(2) A power relay accessory allows this unit to be turned on or off from a remote location.

* (3) A charge failure alarm relay assembly can be connected to extend an external alarm in the event of a d-c current failure.

* (4) When higher equalize charge voltage is supplied, an equalize charge timer will automatically restore usual float operation after a preset interval of up to 24 hours.

* (5) A high-low voltage alarm accessory, if provided, can be connected to give an alarm in the event that the output voltage goes above or below preset values.

3. INSTALLATION

a. Location

This FLOTROL Rectifier operates best in a well ventilated area which has an ambient temperature range between -22°F to +122°F. It should also be located to limit the length of and voltage drop in its d-c output leads.

b. Mounting

This FLOTROL Rectifier can either be wall or relay rack mounted. Its dimensions are indicated in paragraph 1 b, above.

CAUTION: In mounted position, vent openings at top and bottom of cabinet must be unobstructed. The temperature entering the bottom of the cabinet should not exceed 122°F. If this unit is mounted in a relay rack with other heat producing equipment, it may be necessary to provide a ventilation space both above and below the cabinet to insure that the maximum operating temperature will not be exceeded. Where this unit is operated at full load, in high ambient locations, a space of 5-1/4 inches above and below the cabinet is recommended.

c. Preliminary Adjustment

Check to see that input voltage taps are connected to correspond to the a-c service voltage available. Check adjustment lead on transformer T3 to see if it is connected to the proper terminal for the a-c service voltage available.

3. d. Electrical Lead Entrance Options

Electrical lead entrance can be made through insulating bushings at the upper rear of each side of the rectifier cabinet. Hole plugs, of similar size are located at either side of cabinet top; if alternate lead entrance is desired, plugs and bushings can be interchanged. Each bushing can be replaced by a standard conduit fitting.

e. Output Lead Requirements

Output terminal block capacity and wire size is indicated on the wiring diagram or on the power data sheet.

To assure correct d-c voltage regulation at the battery or power board, the voltage drop in the FLOTROL Rectifier output leads should be minimized. Recommended output wire size and output terminal block capacity indicated on the wiring diagram or on the power data sheet will limit this voltage drop to 1.0 volt or less at full-load output current of FLOTROL Rectifier so long as the output loop length (*) does not exceed the maximum specified for each wire size.

These units are designed to compensate for an output lead drop of up to 1.0 volt if the output voltage sensing leads are connected directly to the battery.

It is recommended that the output lead voltage drop never exceed 1.0 volt.

* Loop length is the sum of both the positive and negative output lead lengths.

f. Electrical Connections

(1) General

To gain access to installer connections, open front cover of FLOTROL Rectifier. As viewed from the front, input terminal block TB1 is at upper left front of cabinet, while d-c output terminal lugs TB4 are at the right on the rear baseplate. Control terminal strip TB5 is located to the right of the input circuit breakers CB2-3. If any of the alarm accessories are furnished, their terminal blocks are located on the rear of the front cover.

(2) Power Connections

CAUTION: Before making any electrical connections, be certain that the toggles of the a-c input circuit breakers are thrown to the OFF position.

(a) Bring d-c output leads through output bushing and connect at OUTPUT terminal lugs as indicated by polarity markings.

3. f. (2) (continued)

CAUTION: There will be a current surge and an arc when the charger is connected to the battery. This is caused by the charging of the filter capacitors.

(b) For nominal 115 volt a-c input, it will be necessary to connect a busbar jumper between terminal "L2" and terminal 1 on terminal block TB1. For nominal 230 volt a-c input, the busbar jumper must not be used.

(c) Bring single-phase a-c power leads through input bushing and connect to input terminal block TB1. When using 115 volt a-c service, connect the neutral side of the a-c service, to the lug on the busbar and the other lead to terminal "L1".

(d) When using 230 volt a-c service, connect the input leads to terminals "L1" and "L2". Recommended size of input leads and a-c branch circuit fusing are given on the power data sheet or on the wiring diagram furnished in this instruction book.

(e) A chassis ground lug is provided. This lug can be connected to an earth ground.

NOTE: Unless otherwise specified, this FLOTROL Rectifier is shipped with the busbar jumper connected only to TB1 terminal 1.

g. Control Connections

Control connections are made at terminal block TB5 which is adjacent to the d-c output terminal block.

(1) Reference Voltage Leads

Control terminals 1 (positive) and 2 (negative) are reference voltage terminals which, unless otherwise specified, are factory-connected to FLOTROL Rectifier output terminals. These connections cause a voltage control circuit to regulate FLOTROL Rectifier output voltage.

In order to take full advantage of the close output voltage regulation characteristics of this FLOTROL Rectifier, terminals 1 and 2 can be disconnected from FLOTROL Rectifier output terminals, then leads can be extended from terminals 1 and 2 to battery or power board at which d-c voltage regulation is required. If voltage drop in FLOTROL Rectifier output leads will exceed 1% of output voltage at full rated output current of FLOTROL Rectifier, reference voltage leads must be extended to hold battery voltage constant.

3. g. (1) (continued)

CAUTION: Polarity of reference voltage leads is critical. If necessary to extend reference voltage leads, make connections carefully to assure that polarity is correct.

When a battery installation contains end cells, these cells are usually charged by a separate end cell charger. After a-c power failure or d-c overload has caused battery discharge, it may be desirable to transfer output of this FLOTROL Rectifier to recharge both normal battery and end cells. Extended reference voltage leads can be connected to permit charging of end cells by method described in 5 d, below.

(2) Rectifier Paralleling

This FLOTROL Rectifier is equipped with an automatic current limiting circuit. This circuit will enable the paralleling of this FLOTROL Rectifier with any other battery charger which can be adjusted to the same output voltage. The load may not be shared proportionally but when this FLOTROL Rectifier reaches its current limit setting, it will not deliver further current and any additional load must be supplied by the other paralleled battery charger(s).

(3) Load Sharing Circuit

This FLOTROL Rectifier is equipped with a load sharing circuit which enables it to share the load in proportion to the output current ratings with any other "M" Series 25 volt FLOTROL Rectifier equipped with a compatible circuit. A paralleling connection is to be made between the paralleling terminals (terminal #3 of the control terminal strip) of each FLOTROL Rectifier. Refer to the power data sheet or the wiring diagram for recommended size of the load sharing lead. For proper operation, it is essential that each FLOTROL Rectifier be adjusted to the same output voltage, following the procedure outlined below:

(a) Temporarily open the rectifier paralleling lead by disconnecting the lead.

(b) With the other paralleled FLOTROL(S) turned off, make sure FLOTROL Rectifier No. 1 is adjusted to the required output voltage (with a load somewhere between 1/4 to full load).

(c) With the paralleled FLOTROL Rectifiers turned on but with the paralleling lead open, adjust the output voltage of each paralleled FLOTROL Rectifier until it shares the load, as nearly as possible in proportion to the ratings with the Number 1 FLOTROL. This should assure that all FLOTROL Rectifiers are adjusted to the same voltage.

3. g. (3) (d) Reclose the paralleling circuit between all paralleled FLOTROL Rectifiers. This should insure that the FLOTROL Rectifiers will proportionally share the load under all conditions of line voltage and load.

(e) If after the paralleling connections are made a FLOTROL Rectifier does not share the load in proportion to its rating, it indicates that the load sharing potentiometer R18 has been disturbed from its factory setting. After it is assured that the FLOTROL Rectifiers have all been adjusted to the same output voltage by the method indicated above, this load sharing adjustment may be readjusted. To increase portion of charging current supplied by this FLOTROL Rectifier, slowly turn shaft of potentiometer R18 counterclockwise; to decrease portion of charging current furnished by this FLOTROL Rectifier, slowly turn shaft clockwise.

(4) Power Alarm

This FLOTROL Rectifier extends an external alarm in event of a-c power failure. Terminals 4 to 5 furnish a closed-loop circuit, and a closed-loop circuit between terminals 5 to 6 is broken in the event of an a-c power failure.

(5) Remote Control

If this FLOTROL Rectifier has an accessory remote control relay, it is necessary to supply 24 volt d-c between terminals 7 and 8 to operate the relay.

(6) Accessory Charge Failure Alarm Relay Connections

If furnished, a charge failure alarm relay actuates closed circuits across terminals 4 to 5 and 7 to 8 of TB7 and breaks circuits between terminals 3 to 4 and 6 to 7 in the event of a charge failure.

(7) Accessory High-Low Voltage Alarm Relay Connections

If furnished, a high-low voltage alarm relay actuates closed circuits across terminals 4 to 5 and 7 to 8 of TB8 and breaks circuits between terminals 3 to 4 and 6 to 7 during an alarm condition.

h. Installation Check

(1) To turn on FLOTROL Rectifier, throw toggles of A-C INPUT circuit breakers to ON position. Note d-c output voltage and output current as indicated by the voltmeter and an ammeter.

3. h. (2) Check settings of battery float voltage and charge-equalize voltage. Reset, if necessary. Refer to paragraphs 4 c and d, below.

4. ADJUSTMENTS

a. General

Input voltage adjustments are made by connections at an adjustment terminal board TB2 and transformer T3.

Float output voltage and equalize voltage adjustment potentiometers are accessible on the meter panel at the front of the FLOTROL Rectifier.

b. Input Voltage Adjustment

This adjustment is made by terminal link connections on adjustment terminal board TB2 and an adjustment connection on T3.

(1) Select required input voltage range setting by connection of terminal links between terminals of terminal board TB2 per paragraph 1 c, above.

(2) Connect the tagged red adjustment lead which goes to transformer T3 to either terminal 2 or terminal 3 of T3 depending on a-c service voltage available. Connect the lead to terminal 3 if 230 volt a-c service is used; if 115 volt a-c service is used, connect the lead to terminal 2.

(3) Refer to paragraph 3 f (2) for proper connection of input terminal block busbar jumper.

c. Battery Float Voltage

Potentiometer FLT VOLT ADJ sets value of d-c voltage which this FLOTROL Rectifier will maintain constant at battery or power board at which it is required. Setting of this potentiometer should be changed only in small increments. Before adjustment is made, be certain that battery is fully charged.

(1) To increase battery float voltage, turn screwdriver adjustment shaft of potentiometer FLT VOLT ADJ clockwise; to decrease battery float voltage, turn shaft counterclockwise.

(2) When setting of potentiometer FLT VOLT ADJ has been changed, allow battery voltage to stabilize at its new value, then note whether this value is as desired.

(3) Repeat Steps (1) and (2), above, as necessary to obtain required battery float voltage.

4. d. Charge-equalize Voltage

Potentiometer EQ VOLT ADJ sets voltage supplied to recharge battery after discharge, or to equalize charge of all battery cells. This adjustment is separate from, and it does not affect setting of, potentiometer FLT VOLT ADJ.

(1) To obtain charge-equalize voltage, throw toggle of FLT-EQ switch to EQ position.

(2) Allow d-c output voltage of FLOTROL Rectifier to stabilize at its new value. To increase charge-equalize voltage, turn screwdriver adjustment shaft of potentiometer EQ VOLT ADJ clockwise; to decrease charge-equalize voltage, turn shaft counterclockwise.

(3) Repeat Step (2), above, as necessary to obtain desired charge-equalize voltage.

e. Rectifier Load Sharing

Refer to 3 g (2) and 3 g (3), above.

f. Equalize Charge Timer

When an accessory equalize charge timer is installed, it can be adjusted to time an equalize charge period up to 24 hours. If furnished, the timer is mounted on the back of the front cover.

To adjust the timer, remove the timer cover and adjust the calibrated dial so that the desired equalize charge period is aligned opposite the index marker.

g. Output Current Limit

This adjustment, which determines value to which an overload circuit will limit FLOTROL Rectifier output current, is made by potentiometer CUR LIM ADJ. Maximum output current can be adjusted approximately between 100% and 125% of full load output current rating. To increase the output current limit, turn screwdriver adjustment shaft clockwise; to decrease, turn shaft counterclockwise.

h. High Voltage Shutdown Circuit Adjustment

This adjustment sets value at which d-c output current will be turned off if output voltage reaches a preset value. If the high voltage shutdown limit was specified on the order, this has been adjusted as requested. If no limit was specified, it has been set at 27.5 volts. The high voltage shutdown setting has a tolerance of ± .5 volt. Should it become necessary to change this setting, use the following procedure:

4. h. (1) Turn FLOTROL Rectifier off, disconnect battery (or load if used as a battery eliminator) from output terminals of the unit. If reference voltage leads are extended, reconnect them to output terminals of FLOTROL Rectifier.

(2) Apply about a 10 amp load.

(3) Turn R1404 on circuit card A14 fully clockwise.

(4) Turn the FLOTROL Rectifier on and note the float voltage setting. Throw FLT-EQ switch to the EQ position and note equalize voltage setting.

(5) Adjust EQ VOLT ADJ potentiometer to obtain the desired shutdown voltage. If the desired voltage cannot be obtained with the EQ VOLT ADJ potentiometer fully clockwise, it will be necessary to turn the FLT VOLT ADJ potentiometer in a clockwise direction to obtain the desired shutdown voltage.

NOTE: A time delay of approximately 1 minute may occur before unit is shutdown.

(6) Slowly turn adjustment screw of R1404 counterclockwise until circuit breaker CB1 trips. When CB1 trips, turn R1404 two complete turns clockwise. Turn CB1 on. If CB1 trips after 1 minute, turn R1404 2 complete turns clockwise. Turn CB1 on and wait another minute. Repeat this process until CB1 does not trip after one minute. When CB1 does not trip, adjust EQ VOLT ADJ or FLT ADJ potentiometer to raise FLOTROL Rectifier output voltage 0.5 volt. Wait one minute. If CB1 does not trip, turn R1404 one turn counterclockwise (or as necessary) to cause CB1 to trip. Repeat the above process until CB1 trips 0.5 volt above the desired shutdown value.

(7) When the adjustment is completed, readjust the FLT VOLT ADJ and EQ VOLT ADJ potentiometers to obtain original float and equalize voltages.

(8) Extend voltage reference leads if desired.

i. Accessory High-Low Voltage Alarm Assembly Adjustment

If a high-low voltage alarm assembly is provided, potentiometers R1305 and R1308 on plug-in card A13 set the d-c output voltages at which the respective low and high voltage alarms are given. When alarm voltages are not specified on original order, potentiometer R1305 is adjusted to give an external alarm when d-c output voltage drops to approximately 2.05 volts per cell. Similarly, potentiometer R1308 is adjusted to give an alarm at approximately 2.30 volts per cell. These adjustments are performed at the factory, and no further adjustments should be required.

4. i. (continued)

If it becomes necessary to change either of the voltage settings, the following procedure should be used:

(1) Turn FLOTROL Rectifier off, disconnect battery (or load if used as a battery eliminator) from output terminals of the unit. If reference voltage leads are extended, reconnect them to output terminals of FLOTROL Rectifier.

(a) To adjust value at which the low voltage alarm is given:

1. Turn adjustment screw of R1305 fully counterclockwise and R1308 fully clockwise. With the FLOTROL Rectifier turned on, note the float voltage setting. Set output voltage by means of FLT VOLT ADJ potentiometer to value at which the low voltage alarm is desired.

2. Connect an ohmmeter between terminals 4 and 5 of TB8. With R1305 fully counterclockwise, the ohmmeter should indicate an open circuit. After FLOTROL Rectifier output voltage is adjusted to value at which the low voltage alarm is desired, turn R1305 on plug-in card A13 clockwise until ohmmeter indicates a short circuit. Increase FLOTROL Rectifier output voltage slightly higher than value at which the low voltage alarm was desired; ohmmeter should indicate an open circuit. Repeat this process until the desired alarm setting is reached.

3. Reset original float voltage setting.

(b) To adjust value at which a high voltage alarm is given:

1. With the FLOTROL Rectifier turned on, note the float voltage setting, then throw FLT-EQ switch to EQ position and note the equalize voltage setting. If the desired voltage cannot be obtained with the EQ VOLT ADJ potentiometer fully clockwise, it will be necessary to turn the FLT VOLT ADJ potentiometer in a clockwise direction to obtain the desired alarm voltage.

2. Connect an ohmmeter across terminals 4 and 5 of TB8. With R1308 fully clockwise, ohmmeter should indicate an open circuit. After FLOTROL Rectifier output voltage is adjusted to value at which the high voltage alarm is desired, turn R1308 on plug-in card A13 counterclockwise

4. i. (1) (b) 2. (continued)

until the ohmmeter indicates a short circuit. Reduce FLOTROL Rectifier output voltage slightly lower than value at which the high voltage alarm was desired; ohmmeter should indicate an open circuit. Repeat this process until the desired alarm setting is reached.

3. Readjust both the original equalize and float voltage settings.

(2) Extend voltage reference leads if desired.

j. Manufacturer Adjustments

Special manufacturer adjustments are made on each FLOTROL Rectifier. It is recommended that no change be made in these adjustment settings:

(1) Potentiometer R9 sets range over which potentiometers FLT VOLT ADJ and EQ VOLT ADJ will adjust battery float voltage and equalize voltage.

(2) Potentiometer R8 sets range over which potentiometer CUR LIM ADJ will adjust value of output current beyond which an output current limiter will prevent further increase of output current.

(3) Potentiometer R18 is adjusted so that 6 volt d-c will appear between FLOTROL Rectifier paralleling terminal 3 and negative d-c output.

(4) Potentiometer R6 is adjusted to prevent a hunting condition (oscillation of FLOTROL Rectifier output voltage or output current) under adverse operating conditions.

5. OPERATION

a. General

Operating controls, together with an output voltmeter and output ammeter, are located on a panel at the front of the FLOTROL Rectifier.

b. Starting and Stopping

To turn the FLOTROL Rectifier on or off manually, throw toggles of A-C INPUT circuit breaker to ON position or OFF position. If a remote control relay is to be used to turn this FLOTROL Rectifier on or off from a remote location, the toggles of the A-C INPUT circuit breakers must be left in the ON position.

NOTE: After starting the Rectifier, a time delay of several seconds may occur before the Rectifier begins to deliver output current.

5. c. Recharge, Equalize Charge

Higher d-c voltage is sometimes required to recharge discharged battery cells, or to equalize charge of all battery cells. To obtain this voltage from the FLOTROL Rectifier, throw toggle of FLT-EQ switch to EQ position; to restore usual battery float operation, throw toggle to FLT position. If this FLOTROL Rectifier has an accessory equalize charge timer, battery float operation will be restored automatically after a preset interval.

CAUTION: Do not supply recharge or equalize charge voltage for a longer period than necessary. Prolonged higher charge voltage will overcharge battery cells and reduce battery life. Refer to battery manufacturer's instructions to obtain recommended equalize charge interval and period.

d. Accessory Equalize Charge Timer

When an equalize charge timer is to be used to time an equalize charge period, the following procedure should be followed:

(1) Set timer for desired charge period (see Section 4 f).

(2) Throw FLOAT-EQUALIZE switch to the EQUALIZE position.

(3) When equalize charge period expires, the FLOTROL will automatically resume float operation. (FLOAT-EQUALIZE switch will remain in the EQUALIZE position.)

(4) The FLOAT-EQUALIZE switch should be manually returned to the FLOAT position after the equalize charge period has expired.

In event of an a-c power failure during the equalize charging period, the timer will repeat its complete timing cycle when the a-c service is restored.

e. End Cell Charging

In a battery installation which includes end cells, after a-c power failure or d-c overload has caused battery discharge, it may be desirable to transfer output of this FLOTROL Rectifier to charge both normal battery and end cells. Necessary wiring connections to battery, load and two switches, not furnished with this FLOTROL Rectifier, are shown in Figure 1. Note that the extended reference leads are always connected across normal battery only.

5. e. (continued)

As battery voltage decreases through discharge, load switch SW2, Figure 1, is thrown to its lower position to connect end cells in series with normal battery and load to maintain load voltage. To charge end cells connected in this manner, throw output switch SW1 to its lower position; this transfers the output of FLOTROL Rectifier across normal battery plus end cells. The output voltage will increase to maintain regulated voltage across normal battery while end cells are also charging.

As battery voltage increases through recharging, load switch SW2 is thrown back to its upward position to transfer d-c load back to normal battery and limit load voltage. At this time, output switch SW1 should be thrown back to its upper position to transfer FLOTROL Rectifier output back to normal battery only.

NOTE: If desired, once load switch SW2 has been returned to its upward position, end cells can be charged quickly by leaving output switch SW1 in its lower position. This connects the end cells in series between FLOTROL Rectifier output and d-c load; since this results in high end cell charging current, end cells should be checked continuously to avoid overcharging.

f. Manual Output Voltage Regulation

In event of a defective regulator circuit, potentiometer AUTO-MAN can be used to set the FLOTROL Rectifier output voltage manually. This manual adjustment will only set the output voltage to the correct value for only one given condition of a-c input voltage and output current; any variation of input voltage or output current will then cause the output voltage to vary.

(1) To regulate the charging voltage manually, turn potentiometer AUTO-MAN clockwise as necessary to obtain the desired output voltage.

(2) To restore automatic regulation of charging voltage, turn potentiometer AUTO-MAN counterclockwise until the AUTO-MAN switch clicks.

g. High-Voltage Shutdown

This circuit will monitor the output voltage continuously and shut off the FLOTROL Rectifier if battery voltage should increase to a preset value. If the high voltage shutdown limit was specified on the order, this has been adjusted at the factory as requested; if no limit was specified, the limit has been set at 27.5 volts. In order to resume operation after shutdown has been made, throw toggle of circuit breaker CB1 to ON position; repeated shutdown indicates a failure which causes excessive d-c output voltage.

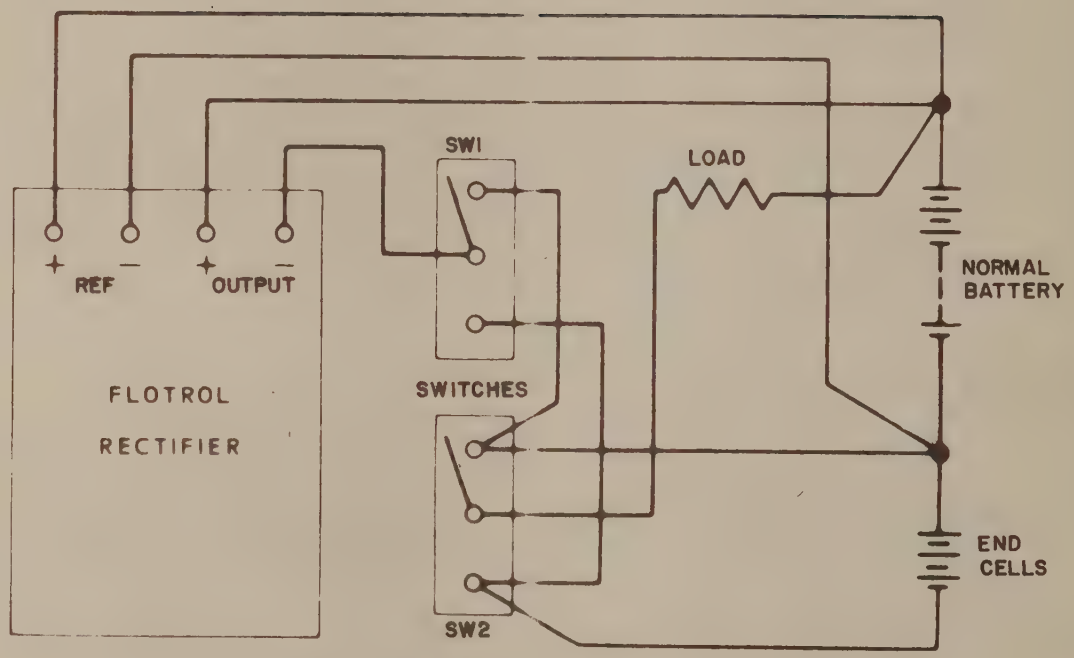


FIGURE 1 END CELL CHARGING

5. h. Alarm Indications

A-c power failure or rectifier failure provides for a closed-circuit actuated alarm to be extended.

If a-c control fuse F1 should open, a parallel connected neon lamp will light. This lamp is located in the cap of the F1 fuseholder on the meter panel.

If a Charge Failure Alarm Relay Assembly is furnished, it can be connected to give an external alarm in event of d-c output current failure or a-c power failure. Under normal operating conditions, the Charge Failure Alarm Relay is operated and no alarm is given. The Charge Failure Alarm Relay will remain operated until the output current drops below 2% of the rated FLOTROL Rectifier output current. When output current increases to 4% of rated value, the Charge Failure Alarm Relay operates, turning off the external alarms.

A high-low voltage alarm relay accessory, if furnished, provides for an external alarm to be given in the event the output voltage goes below a value set by potentiometer R1305 or above a value set by potentiometer R1308 on card A13. This alarm will appear only as long as the high or low voltage condition exists.

i. Circuit Breakers, Fuses

(1) Circuit Breakers

Input circuit breakers CB2 and CB3 protect against excessive a-c input. The opening of the circuit breakers is indicated by the movement of their toggles from ON position to OFF position; to reset the circuit breakers, throw the toggles to the ON position.

Circuit breaker CB1 is part of the high-voltage shutdown circuit. A high output voltage condition will cause circuit breaker CB1 to open and thereby turn off the FLOTROL Rectifier. In order to resume operation, the toggle of CB1 will have to be thrown to the ON position.

(2) Fuses

Fuse F1 protects the control circuit; fuse F3 protects against excessive d-c output current. Fuse F1 is located on the meter panel of the FLOTROL Rectifier; fuse F3 is located inside of the cabinet.

Type and size of each fuse is indicated in paragraph 1 f, above.

j. Component Boards

Any of the following component boards can easily be replaced as individual assemblies in the event of a failure of some component on a component board:

5. j. (continued)

Component Board	Description
A1	Firing circuit
A2	Regulator circuit
A11	Accessory Charge Failure Alarm Relay Assy
A13	Accessory High-low Voltage Alarm Assy
A14	High Voltage Shutdown Circuit

To gain access to the component cards, open the front cover of the cabine The cards are located on the rear of the front cover.

6. CIRCUIT DESCRIPTION

The schematic diagram shows the electrical circuits of the FLOTROL Rectifier. Figure 2 of these instructions shows the functional circuits in block form.

a. General

A-c power flows through input circuit breakers CB1-3 and a thyristor circuit composed of CR1 and CR2 to power transformer T1. The T1 secondary voltage is then rectified by diodes CR4 and CR5, filtered, and supplied to the load.

b. Thyristor Circuit

The a-c voltage applied to the primary of power transformer T1 is controlled by the conduction time of thyristors CR1 and CR2. The thyristors used are three element rectifying devices. With reverse voltage applied to a thyristor, it blocks the same as an ordinary diode. If forward voltage is applied to the thyristor and no signal is applied to the gate electrode, the thyristor will also block. When a signal is applied to the gate electrode while forward voltage is applied to the thyristor, the thyristor will conduct.

After the gate signal is removed, the thyristor will continue conducting until the a-c input current is reduced to zero at the end of each half-cycle.

Thyristors CR1 and CR2 are connected in an inverse-parallel configuration in one side of the a-c supply to transformer T1. On one-half cycle, the current flows through one thyristor; and on the other half-cycle, the current flows through the other thyristor.

It can be seen that if the gate pulse is applied to each thyristor at the beginning of its corresponding half-cycle, the thyristor will conduct continuously to furnish full line voltage to the power transformer.

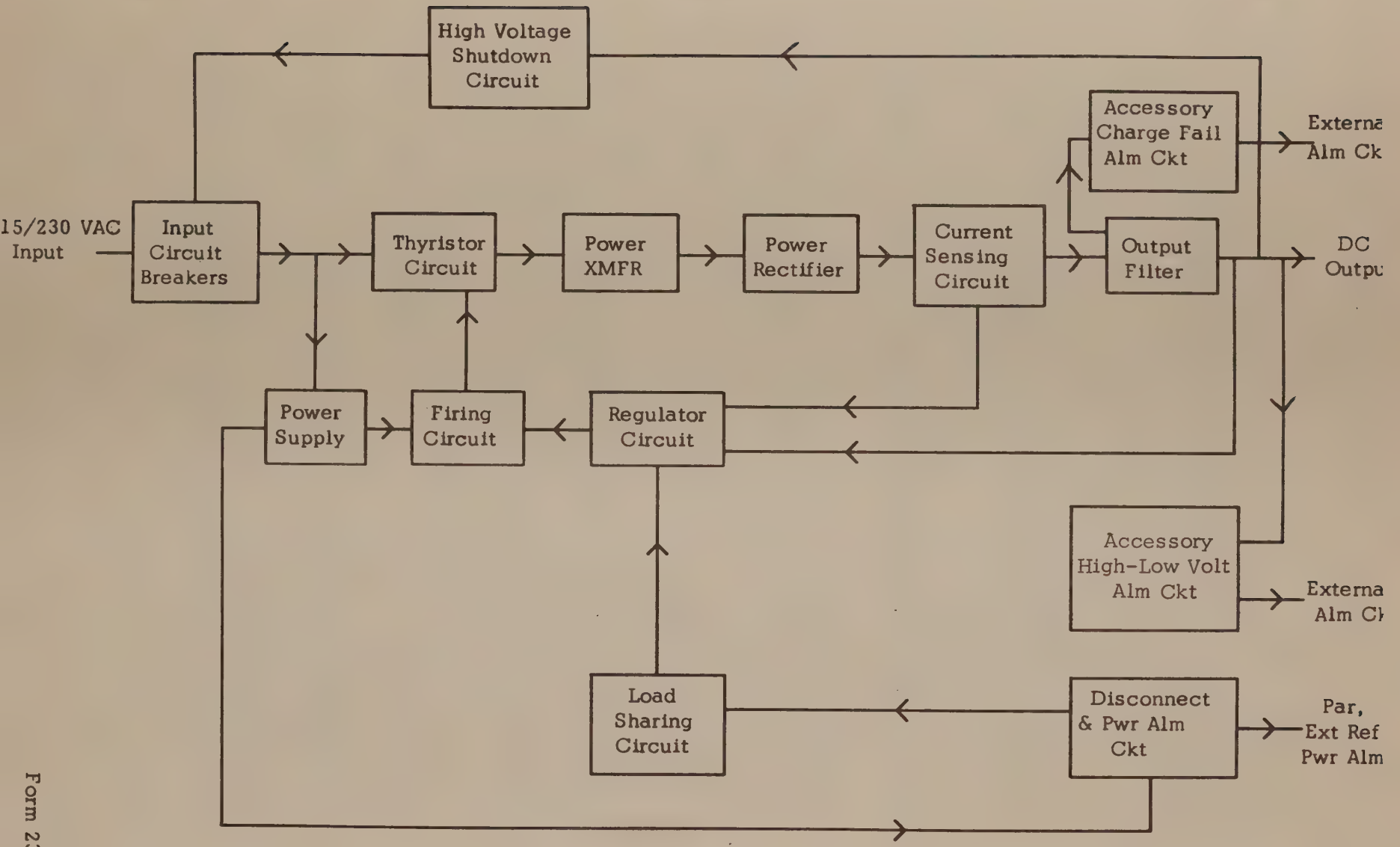


FIGURE 2
BLOCK DIAGRAM
LORAIN LARGE 25V "M" SERIES FLOTROL RECTIFIER

Form 2376

6. b. (continued)

Retarding the gate pulses will reduce the time during which the thyristors conduct, reducing the T1 primary voltage and thus reducing the d-c output voltage.

c. Power Supply

The primary of step-down transformer T3 is connected across the a-c input to the FLOTROL Rectifier. The secondary winding of T3 in turn supplies a-c to the firing circuit and disconnect relay K802.

d. Firing Circuit

The firing circuit supplies the "triggering" pulses to the gate terminals of the thyristors CR1 and CR2, controlling their conduction state.

Pulse transformer T4, transistor Q1, and a full-wave bridge rectifier on circuit card A1 make up the firing circuit. The a-c power supplied to the firing circuit is converted to square-wave by transistor Q1 and a clipping zener diode and applied to the primary winding of pulse transformer T4. The resulting square-wave voltage on the T4 secondary is fed through the gate windings of saturable reactor L4 to the gate and cathode terminals of the thyristors.

e. Saturable Reactor L4

The duration of the firing pulses produced by the firing circuit is controlled by the saturable reactor L4. The windings of saturable reactor L4 between terminals 5 and 6 are connected across the output of the FLOTROL Rectifier to bias the saturable reactor. L4 windings between terminals 7 and 8 are used in conjunction with the regulator circuit to control the saturation of L4.

With L4 operating below saturation, there is high impedance to the flow of current from pulse transformer T4. When the saturable reactor L4 reaches saturation, current is allowed to flow from the pulse transformer to the gate and cathode terminals of the thyristors.

In this way, the width of the firing pulses and thus the conduction time of the thyristors is controlled.

f. Voltage Regulator Circuit

This circuit compensates the output voltage of the FLOTROL Rectifier against variations of a-c line voltage and d-c output current.

6. f. (continued)

A voltage divider, consisting of R804, R9, R10 and R11, is connected across the reference leads. The voltage developed across a portion of R9 and R10 is compared to a constant voltage in the regulator circuit. The regulator circuit in turn controls the amount of control current in saturable reactor L4 to control its saturation level. With saturable reactor L4 at saturation, the impedance of the gate windings is negligible to permit the square wave triggering pulses from the firing circuit to be supplied to the gates of the thyristors. If the sensing circuit senses an increase in output voltage, the reference circuit will cause saturable reactor L4 to be saturated for a shorter portion of the time to decrease the duration of the firing pulses. This decreases the conduction time of the thyristors and thus reduces the output voltage. Similarly, if the sensing circuit senses a decrease in output voltage, the regulator circuit will cause saturable reactor L4 to be saturated for a longer portion of time to increase the duration of the firing pulses. This increases the conduction time of the thyristors and thus increases the output voltage proportionally.

The regulator circuit also works with the current sensing circuit to limit the output current of the FLOTROL Rectifier.

g. Current Sensing Circuit

The primary winding of transformer T2, in series with the positive output of the FLOTROL Rectifier, is used to sense the output current. The T2 secondary current, which is proportional to the FLOTROL Rectifier output current, is rectified and supplied across resistances R7 and R8. R7-R8 voltage is then applied to the regulator circuit. In the event of an overload condition, the proportional increase in T2 secondary current and resulting increase in R7-R8 voltage will cause the regulator circuit to decrease the time during which L4 remains saturated. This will cause a decrease in the duration of the "triggering" pulses supplied to the gate terminals of the thyristors, reducing their conduction time and preventing further increase of output current.

h. Load Sharing Circuit

When two FLOTROL Rectifiers are connected for parallel operation, the units are connected together by means of a load sharing (PAR) lead. If one of the paralleled units starts to deliver more than its rated share of the load, the current flowing in this lead will cause the regulator circuit in the FLOTROL Rectifier supplying more than its share of the load to decrease its output voltage while the regulator circuit in the other FLOTROL Rectifier causes its output voltage to increase, thereby equalizing the voltage.

6. i. High Voltage Shutdown Circuit

A high voltage shutdown circuit is connected across the FLOTROL Rectifier output. With the FLOTROL Rectifier operating normally, the high voltage shutdown circuit has no effect on the FLOTROL Rectifier. Should the output voltage increase to the value determined by the setting of R1404 on circuit card A14, this circuit will cause circuit breaker CB1 to open which in turn opens the a-c input supply shutting off the FLOTROL Rectifier. The FLOTROL Rectifier will remain shut off until the circuit breaker is returned to the ON position.

j. Disconnect Relay

With the FLOTROL Rectifier in operation, contacts of the disconnect relay K802 complete the following circuits: load sharing circuit, reference circuit, and a closed circuit between POWER ALARM terminals NO and C. Should there be an a-c power failure or if the FLOTROL Rectifier is turned off, the disconnect relay releases and these circuits are broken. Additional contacts of this relay, released, close a circuit between POWER ALARM terminals NC and C.

k. Accessory Alarm Circuits

(1) Charge Failure Alarm Accessory, Circuit Card A11

The charge failure alarm circuit senses the output ripple across a winding of choke L1. This ripple voltage causes the charge failure alarm circuit to operate the relay on circuit card A11. If the charging current should decrease to no load, the charge failure alarm circuit senses a decrease in ripple voltage and releases the relay. Contacts of the charge failure alarm relay, released, close circuits between terminal strip TB7 terminals 4 to 5 and 7 to 8 and open circuits between TB7 terminals 3 to 4 and 6 to 7.

(2) High-Low Voltage Alarm Accessory, Circuit Card A13

Alarm relay K1 is normally operated. It releases to extend an external alarm when FLOTROL Rectifier output voltage either increases or decreases to preset values.

Two voltage sensing networks compare a portion of the output voltage with a constant voltage developed in the high-low voltage alarm circuit. Should the output voltage decrease to value determined by the setting of potentiometer R1305, or increase to value determined by the setting of potentiometer R1308, relay K1 releases to close circuits between terminal strip TB8 terminals 4 to 5 and 7 to 8 and open circuits between TB8 terminals 3 to 4 and 6 to 7.

ELECTRICAL PARTS LIST
LORAIN MODEL M100F25 FLOTROL RECTIFIER
SPEC. NO. 5274-010

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ACCESSORIES			
(Quantity of spare parts for an accessory applies only if the accessory is furnished with the equipment.)			
A11	4846-096	Charge Fail Alarm Relay Assy	1
A13 K1	4863-012	24V High-Low Volt Alarm Assy	**
	4826-083	Battery Eliminator Filter Assy	**
K6	2561-033	Contactor, DC 24V 200 Amp	1
M3	2544-452	Relay, AC Time Delay	1
ASSEMBLIES			
A1	4338-038	Firing Circuit	1
A2	4335-015	PC Board	1
A8	4338-043	Component Board	1
A14	4338-033	High Voltage Shutdown	1
	4738-001	Rectifier	**
CAPACITORS			
C5A	2731-390	48,000UF 40 Volt, Electrolytic	-
C5B	2731-390	48,000UF 40 Volt, Electrolytic	-
CIRCUIT BREAKERS			
CB1	2567-100	100 Amp	1
CB2	2567-090	60 Amp 120 Volt AC	1
CB3	2567-074	30 Amp 120 Volt AC	1
FUSES			
F1	2484-218	.5 Amp 250 Volt	3
F3	2484-537	150 Amp	2

ELECTRICAL PARTS LIST
LORAIN MODEL M100F25 FLOTROL RECTIFIER
SPEC. NO. 5274-010

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
INDUCTORS			
L1	4413-016	No. 1	-
L2	4411-515		-
METERS			
M1	2944-668	0-30 Voltmeter, DC	-
M2	2924-676	0-150 Ammeter, DC	-
RESISTORS			
R4	2686-140	5K Ohm 2 Watt, Potentiometer	1
R5	2656-609	75 Ohm 50 Watt, Fixed	1
R6	2683-687	25K Ohm 4 Watt, Variable	1
R7	2683-235	50 Ohm 2 Watt, Variable	1
R8	2683-248	250 Ohm 2 Watt, Variable	1
R9	2683-248	250 Ohm 2 Watt, Variable	*
R10	2683-242	100 Ohm 2 Watt, Variable	1
R11	2683-235	50 Ohm 2 Watt, Variable	*
R12	2982-713	150 Amp External Shunt	-
R18	2683-248	250 Ohm 2 Watt, Variable	*
SATURABLE REACTORS			
L4	4551-603		-
SWITCHES			
S1	2513-321	DPDT, Toggle	1
TRANSFORMERS			
L3	4511-008	Interphase	-
T1	4452-008	Power	-
T2	4448-609	Current	-
T3	4444-617	Control	-
T4	4434-504		-
TRANSISTORS			
Q1	2842-150	2N3055	1
MISCELLANEOUS			
	2488-105	Fuseholder	1
	2565-621	Socket, Relay	1

ELECTRICAL PARTS LIST
LORAIN MODEL M100F25 FLOTROL RECTIFIER
SPEC. NO. 5274-010

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
MISCELLANEOUS (cont'd)			
	3461-101	Connector, Common	1

LORAIN PRODUCTS CORP.
Lorain, Ohio U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

Printed in U.S.A.

dmb

ELECTRICAL PARTS LIST
LORAIN 4738-001 RECTIFIER ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
CAPACITORS			
C3	2715-283	2.0UF 200 Volt DC	1
C4	2715-283	2.0UF 200 Volt DC	*
DIODES			
CR4	2814-231	1N4589 Silicon	2
CR5	2814-231	1N4589 Silicon	*
RESISTORS			
R1	2651-707	5 Ohm 5 Watt, Fixed	1
R2	2651-707	5 Ohm 5 Watt, Fixed	*
SURGE SUPPRESSORS			
CR3	2416-221		1
THYRISTORS			
CR1	2864-026	Rectifier Inst.	1
CR2	2864-026	Rectifier Inst.	*

LORAIN PRODUCTS CORPORATION
Lorain, Ohio, U.S.A.
LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

Printed in U.S.A.

dmb

ELECTRICAL PARTS LIST
LORAIN 4826-083 BATTERY ELIMINATOR FILTER ACCESSORY ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the Lorain Equipment is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm Spares column, it indicates the part, assembly or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref Desig	LPC Part No.	Description	Quantity Recm Spares
CAPACITORS			
C6A	2731-390	.048F 40V, Electrolytic	-
C6B	2731-390	.048F 50V, Electrolytic	-
RESISTORS			
R3	2668-210	50 Ohm 50W, Fixed	1
R3A	2668-210	50 Ohm 50W, Fixed	*

LORAIN PRODUCTS CORP.
Lorain, Ohio U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

glg

Printed in U.S.A.

ELECTRICAL PARTS LIST
LORAIN 4863-012 24V VOLT ALARM ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

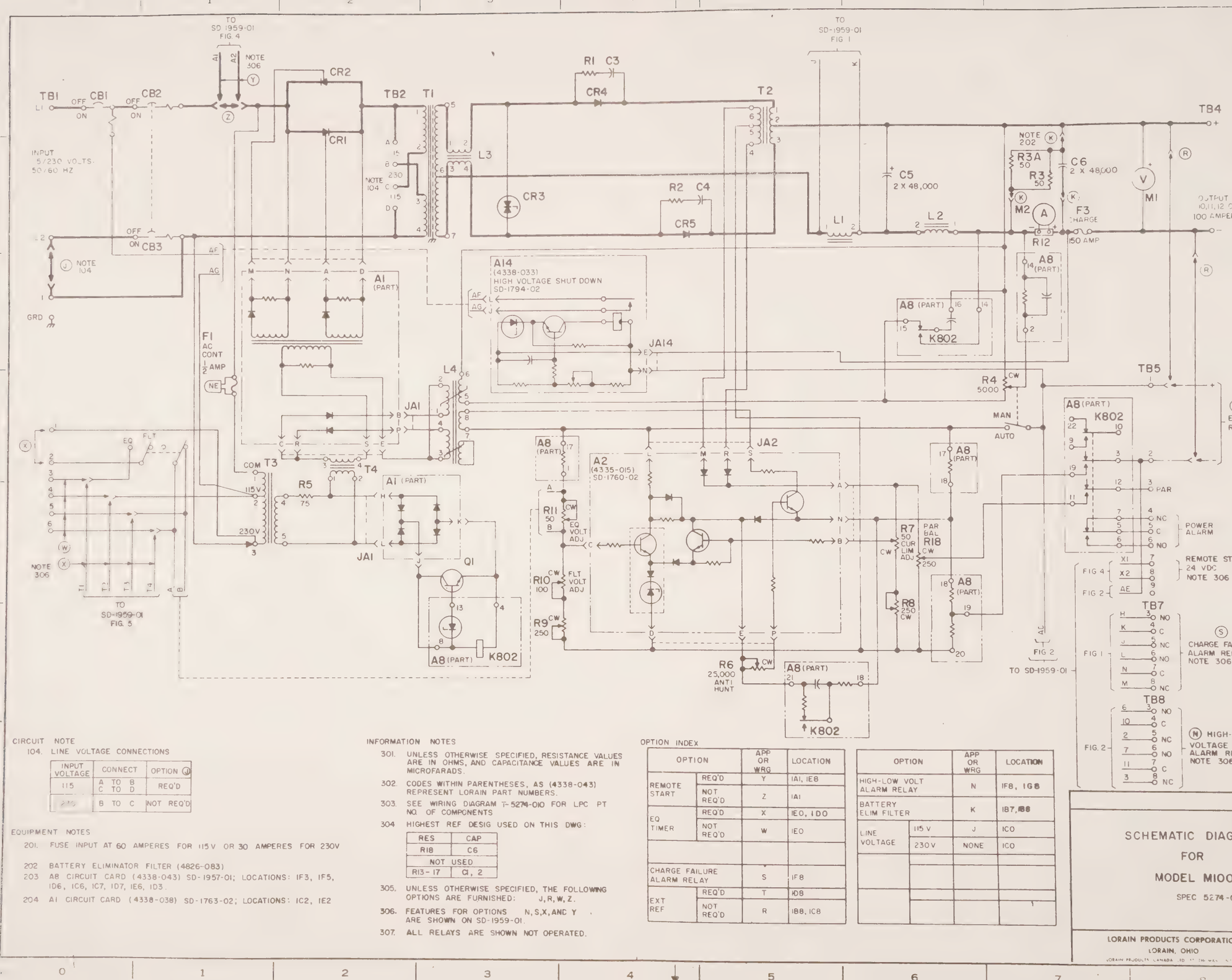
Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
A13	4337-608	Printed Circuit Board	1
RELAYS			
K801	2543-642	24 Volt DC	1

LORAIN PRODUCTS CORPORATION
Lorain, Ohio, U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

Printed in U.S.A.

dmb



CIRCUIT NOTE

104. LINE VOLTAGE CONNECTIONS

INPUT VOLTAGE	CONNECT	OPTION (J)
115	A TO B C TO D	REQ'D
230	B TO C	NOT REQ'D

EQUIPMENT NOTES

201. FUSE INPUT AT 60 AMPERES FOR 115 V OR 30 AMPERES FOR 230V

202. BATTERY ELIMINATOR FILTER (4826-083)

203 A8 CIRCUIT CARD (4338-043) SD-1957-01; LOCATIONS: IF3, IF5, ID6, IC6, IC7, ID7, IE6, ID3.

204 A1 CIRCUIT CARD (4338-038) SD-1763-02; LOCATIONS: IC2, IE2

INFORMATION NOTES

301. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, AND CAPACITANCE VALUES ARE IN MICROFARADS.

302. CODES WITHIN PARENTHESES, AS (4338-043) REPRESENT LORAIN PART NUMBERS.

303. SEE WIRING DIAGRAM T-5274-010 FOR LPC PT NO. OF COMPONENTS

304 HIGHEST REF DESIG USED ON THIS DWG:

RES	CAP
R18	C6
NOT USED	
R13-17	C1, 2

305. UNLESS OTHERWISE SPECIFIED, THE FOLLOWING OPTIONS ARE FURNISHED: J, R, W, Z.

306. FEATURES FOR OPTIONS N, S, X, AND Y ARE SHOWN ON SD-1959-01.

307. ALL RELAYS ARE SHOWN NOT OPERATED.

OPTION INDEX

OPTION		APP OR WRG	LOCATION
REMOTE START	REQ'D	Y	IA1, IE8
	NOT REQ'D	Z	IA1
EQ TIMER	REQ'D	X	IE0, ID0
	NOT REQ'D	W	IE0
CHARGE FAILURE ALARM RELAY		S	IF8
EXT REF	REQ'D	T	ID8
	NOT REQ'D	R	IB8, IC8

OPTION		APP OR WRG	LOCATION
HIGH-LOW VOLT ALARM RELAY		N	IF8, IG8
BATTERY ELIM FILTER		K	IB7, IB8
LINE VOLTAGE	115 V	J	IC0
	230 V	NONE	IC0

ISSUE		
1	NEW	
2	19445 12 "V" OPTION REMOVED 1 69	
3	1831958 6 "K" OPTION WIRING 22 CHANGED 72	
4	1836058 1 R3 AND R3A VALUE 25 SPECIFIED. (K) OPTION 73 WIRING CHANGED	
5	1832816 3 C6 MOVED FROM 29 INPUT SIDE OF 73 R12 TO F3	

SCHEMATIC DIAGRAM
FOR
MODEL M100F25
SPEC 5274-010

REPRO BY		DATE 2-3-68
CHECKED BY		DATE 2-6-68
APPROVED BY		DATE 3-8-68
APPROVED BY		DATE 4-21-69
RATING	STANDARD	

SD-5274-010

LORAIN PRODUCTS CORPORATION
LORAIN, OHIO

SIZE D

SHEET 1 OF 1

THIS DRAWING IS THE PROPERTY OF LORAIN PRODUCTS CORPORATION AND IS LOANED SUBJECT TO RETURN UPON REQUEST. IT IS NOT TO BE USED IN THE PREPARATION OF ANY DRAWING OR SPECIFICATION FOR DISTRIBUTION FOR PURPOSES OTHER THAN PROCUREMENT OF LORAIN PRODUCTS CORPORATION APPARATUS OR FOR ANY PURPOSE OTHER THAN THAT EXPRESSLY AUTHORIZED BY AGREEMENT WITH THE OWNER

| SD-DRAWING ISSUES AND T-DRAWING ISSUES AS FOLLOWS | | |

FIG. 2
BACK OF DOOR

DRAWING ISSUE	
	9-18-67
2	8-2-68
3	12-18-68
4	6-18-71
5	7-23-75
6	7-23-75
7	3-26-77
8	2-3-78

00
(A8)
4338-043
PRINTED CIRCUIT BOARD

01
(R5)
2656-609
75

02
(Q1)
2868-108
SOC
2842-150
TSTR

NOTE 12

03
(R9)
2683-248
250
POT
TOP VIEW

04
(R8)
2683-248
250
POT
TOP VIEW

05
(R18)
2683-248
250
POT
TOP VIEW

06
(R6)
2683-687
25,000
POT.
TOP VIEW

NOTE 14

07
(T4)
4434-504
XMFR

08
2565-628
SOC
2543-642
TSTR

09
(M3)
2544-452
TIMER

NOTE 11

10
(T3)
4444-617
CONT XMFR

11
(L4)
4551-603

14
(TB8)
3165-130 MARKER STR
2463-106 TERM. STRIP

15
(TB7)
3165-130 MARKER STRIP
2463-106 TERM.STRIP

(TB6)
2463-106
3165-310 MARKER STR

16
(JA11)
2475-746
RECEPTACLE

17
(JA1)
2475-746
RECEPTACLE

18
(JA2)
2475-746
RECEPTACLE

19
(JA12)
2475-746
RECEPTACLE

20
(JA14)
2475-746
RECEPTACLE

ISSUE	
MODEL M100F25	T-5274-010
LORAIN PRODUCTS CORPORATION	DWG SIZE D
	SHEET 2
	PRINTED IN U.S.A.

FIG. 3
INPUT AND OUTPUT PANEL

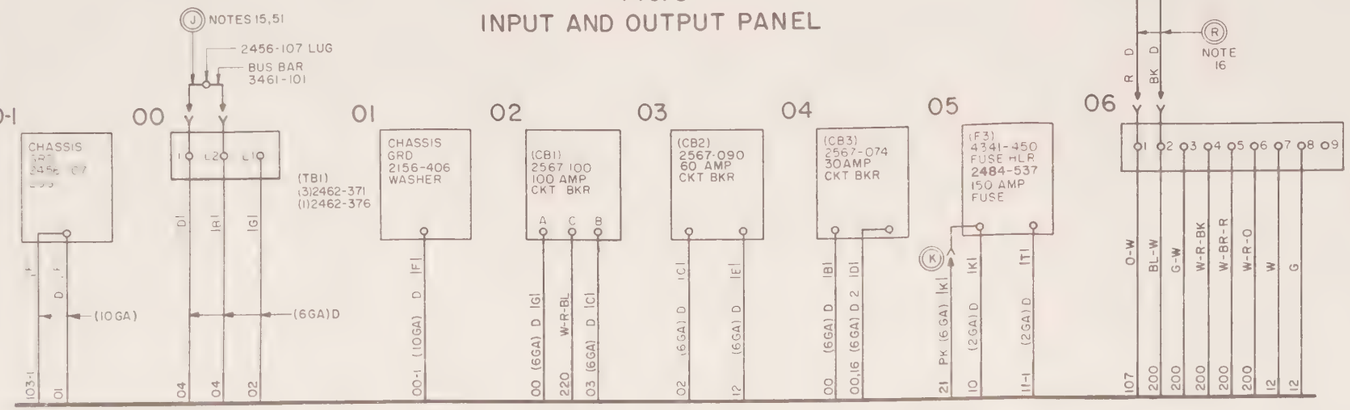
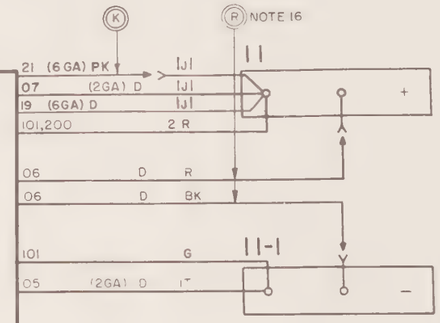


FIG. 4 BASE



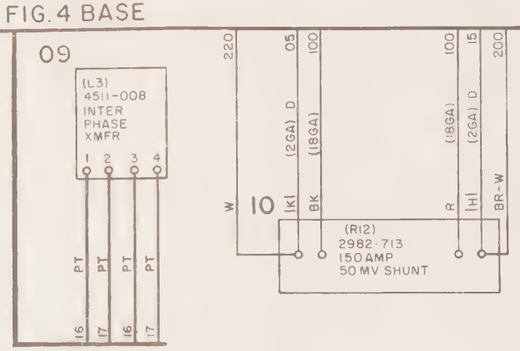
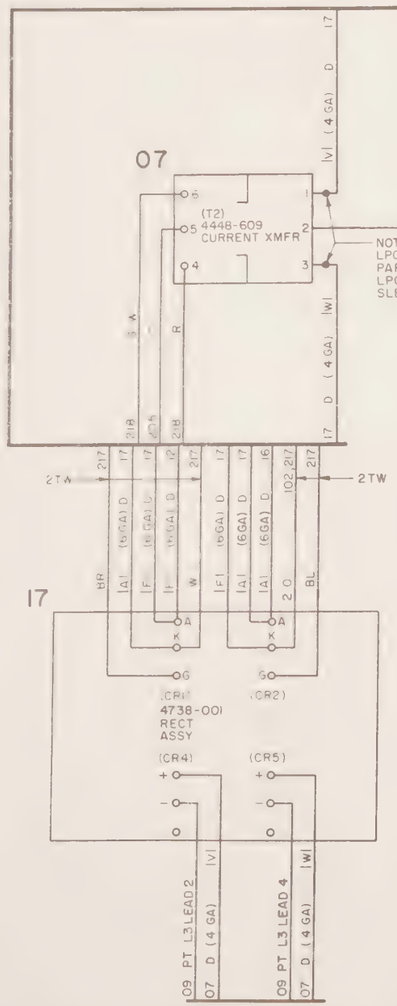
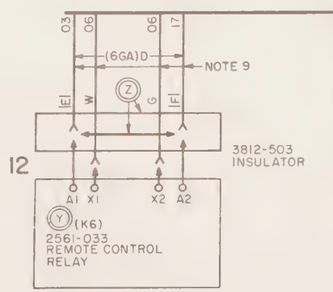
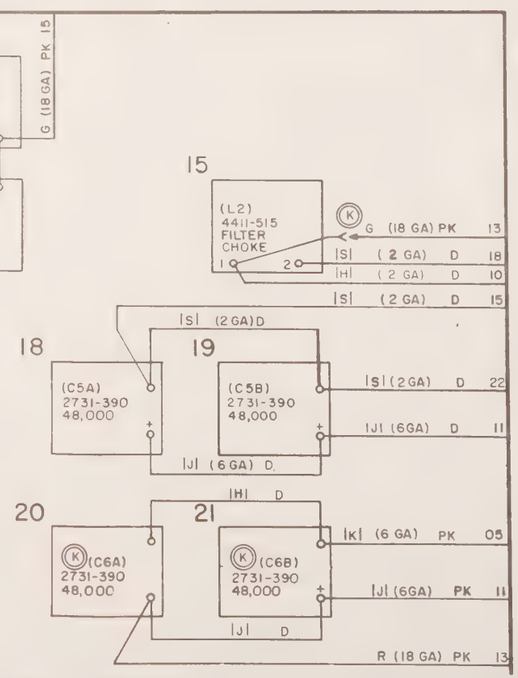
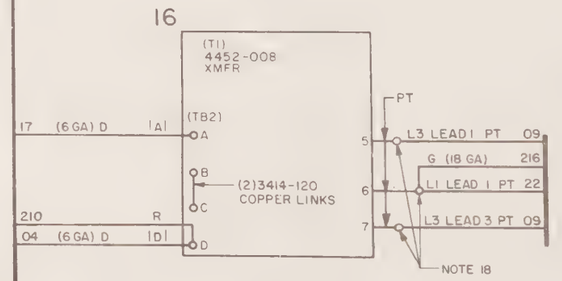


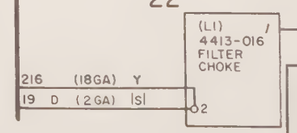
FIG. 5 OPTION PANEL


07
(T2) 4448-609 CURRENT XMFR
NOTE 17 L.P.C. PT. NO. 2467-364 PAR. SPLICE L.P.C. PT. NO 1675-380 SLEEVING
NOTE 17 LPC PT. NO. 2467-362 PAR. SPLICE LPC PT. NO. 1675-379 SLEEVING
2TW
17
(CR1) 4738-001 RECT ASSY
(CR2)
(CR4)
(CR5)
09 PT L3 LEAD 2
09 PT L3 LEAD 4









DRAWING ISSUE	
1	3-18-68
2	8268
3	2-10-69
4	6-18-71
5	6-22-72 JC
6	1-25-73 JC
7	3-28-73 JLW
8	10-19-73 JLW

ISSUE 8

MODEL M100F25

T-5274-010

LORAIN PRODUCTS CORPORATION

DWG SIZE D

SHEET 3

PRINTED IN U.S.A.

FIG. 1

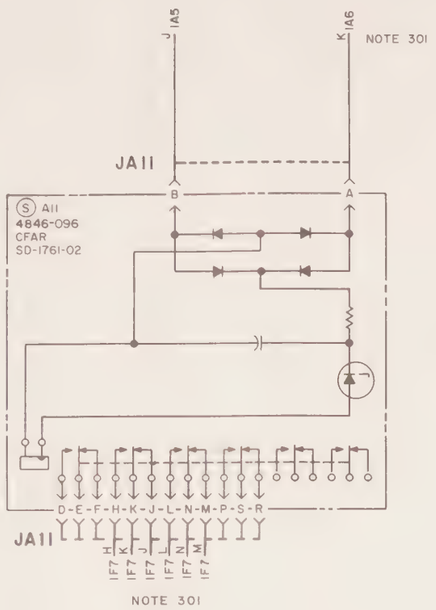


FIG. 2

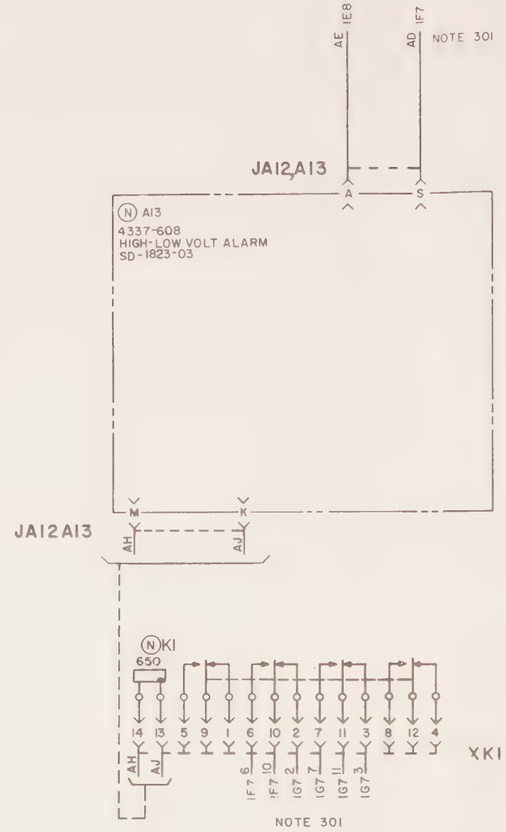


FIG. 4

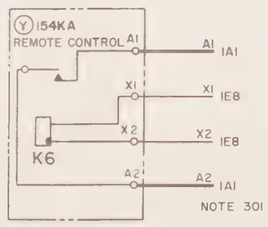
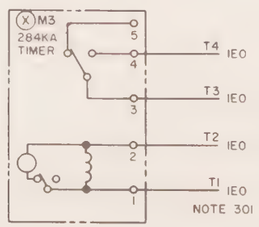


FIG. 5



INFORMATION NOTES

301 DESTINATIONS SHOWN FOR EACH ACCESSORY ARE LOCATED ON SCHEMATIC DIAGRAM OF EACH MODEL USING THESE ACCESSORIES.

DWG ISS	CHG NO	DATE	DRAWN BY	APP BY
1				
2	15159	11-22-65 11-23-65 CH		
3	15256	8 31 66		

AH WIRE ADDED CONNECTION BETWEEN E IN A14 AND A IN A12 REMOVED ERRORS CORR

4	17750	1-23-68	

REMOVED A14 (4338-033) HIGH VOLTAGE SHUT DOWN CIRCUIT. W. C. Sundstrom 1-24-68

CH 1-29-68 MR 2-5-68

5	19446	11-18-69	V OPTION REMOVED

CH 11-21-69 R Van Deusen 11-26-69

SPANISH VERSION AVAILABLE

SD-1959-01 ISSUE 5

ACCESSORIES
FOR
SMALL AND LARGE 1 ϕ "M" SERIES
24V DC SILICON FLOTROL

DRAWN BY G. SOBOTNA	DATE 10-1-65
CHECKED BY	DATE 10-4-65
APPROVED BY	DATE 10-5-65
APPROVED BY	DATE 10-5-65
RATING	STANDARD

0311-909

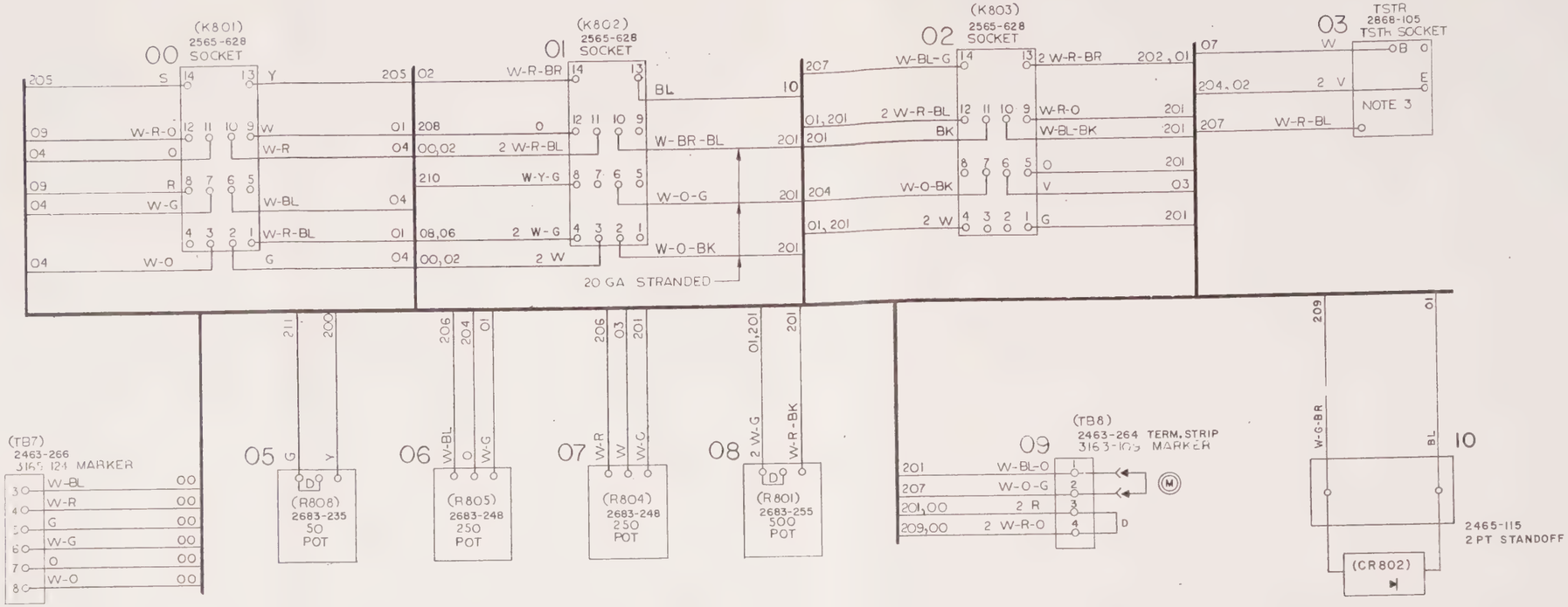
LORAIN PRODUCTS CORPORATION
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD., ST THOMAS, ONTARIO

DWG SIZE D

SHEET 1 OF 1

PRINTED IN U.S.A.

REAR OF MTG BRACKET



"Q" OPTION REMOVED

CR802 AT LOC 101 AND NOTE 5 ADDED.

10 18177 2-15-68 R814 REMOVED, AT LOC 209.

11 18694 10-11-68 Y WIRE LOC 205 WAS W-BK

12 1830169 10-8-70 3876-319 WAS 2475-747 ON SH 2

13 1832356 LOC. 10 ADDED
2565-628 WAS 2565-621 LOC 01

MANUFACTURING NOTES:

1. ALL WIRES SHALL BE 24 GA STRANDED UNLESS OTHERWISE SPECIFIED
2. 'D'-SEPARATE WIRE NOT PART OF WIRING HARNESS
3. MOUNTED WITH MICA INSULATOR OR EQUIVALENT
4. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS

SD-DRAWING ISSUES AND T-DRAWING ISSUES AS FOLLOWS

SD-DRAWING ISSUES																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	19

T-DRAWING ISSUES																			
1	1	1	1	2	3	4	4	5	5	6	7	8	9	10	11	11	11	11	12	13

PIGTAIL COMPONENT INFORMATION			
REF DESIG	L.P.C. PT. NO.	VALUE	LOC
CR802	2812-310		01

WAS T-1785-01

ISSUE 13

WIRING DIAGRAM FOR CONTROL UNIT

4865-703

DRAWN BY A. MARCUCCI	DATE	8-15-64
DSGN BY JAKUBOWSKI	DATE	8-15-64
APPROVED BY	DATE	
APPROVED BY	DATE	

RATING: STANDARD

T-4865-703

LORAIN PRODUCTS CORPORATION
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD., ST THOMAS ONTARIO

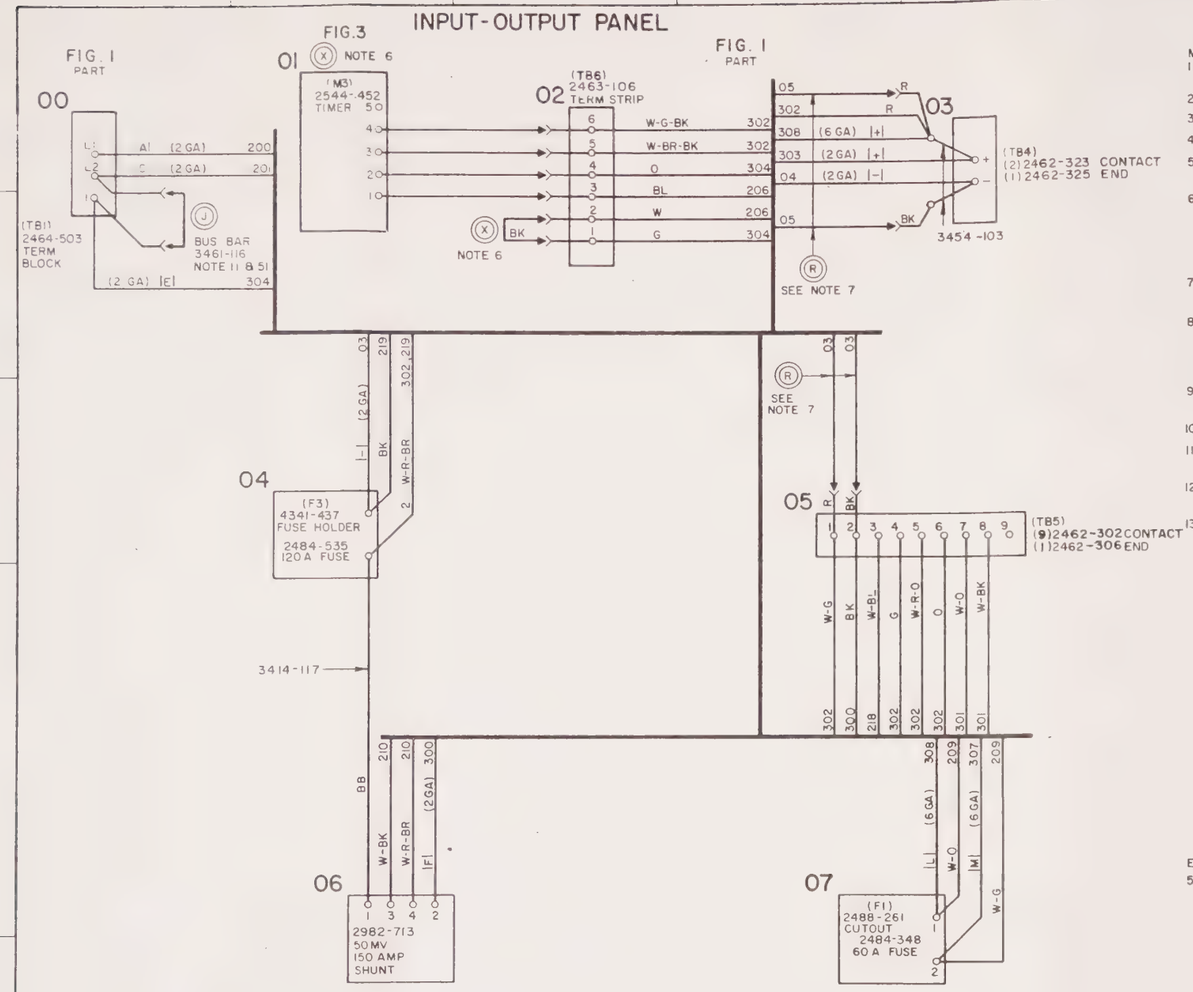
DWG SIZE D

SHEET 1 OF 2

PRINTED IN U.S.A.

LP429

INPUT-OUTPUT PANEL



MANUFACTURING NOTES

1. ALL WIRES SHALL BE 20GA STRANDED UNLESS OTHERWISE SPECIFIED.
2. BI-TERMINAL NEAREST MOUNTING SURFACE.
3. PT-LEADS FURNISHED WITH COMPONENTS.
4. (2 TW)-TWO WIRES SHALL BE TWISTED TOGETHER.
5. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.
6. IF EQ TIMER M3 ("X" OPTION) IS REQUIRED, REMOVED THE FOLLOWING WIRES FROM TB6 AND CONNECT TO M3 TERMINALS; BL TO TERM 1, O TO TERM 2, W-BR-BK TO TERM 3, AND W-G-BK TO TERM 4, CONNECT A JUMPER ACROSS TERMINALS 1 AND 2 ON TB6.
7. WHEN EXTENDED REFERENCE IS NOT SPECIFIED, CONNECT TERMINALS 1 AND 2 OF TB5 TO + AND − OF TB4 AS SHOWN
8. WHEN REMOTE CONTROL RELAY,"Y" OPTION, IS NOT FURNISHED, BOLT NO. 2 GAUGE LEADS TOGETHER WITH 3/8" HDW,"Z" OPTION, AND INSULATE WITH SLEEVING; INSULATE W-O AND W-BK WIRES WITH SLEEVING AND TIE TO NO. 2 GAUGE SLEEVED WIRES.
9. WIRES TO BE CONNECTED TO BACKSIDE OF STUDS ON POWER TRANSFORMER TERMINAL PANEL
10. D-INDICATES LEAD IS A JUMPER.
11. BUS BAR, L.P.C. PT. NO. 3461-116, SHALL BE SUPPLIED WITH EACH FLOTROL.
12. ATTACH L.P.C. PT. NO. 2568-806 HANDLE TIE TO CB1 AND CB2 AFTER THEY ARE INSTALLED IN PANEL.
13. BB-INDICATES BUS BAR.

ENGINEERING NOTES:

51. FOR 115V INPUT, "J" OPTION, CONNECT BUS BAR, L.P.C. PT. NO. 3461-116, BETWEEN "L2" AND NO.1 TERMINALS ON TB1; CONNECT SERVICE WITH NEUT. SIDE TO "L2" TERMINAL AND OTHER SIDE TO TERMINAL "L1". FOR 230V INPUT, REMOVE BUS BAR FROM "L2" AND NO.1 TERMINALS OF TB1; CONNECT SERVICE TO "L1" AND "L2" TERMINALS. FOLLOW TABLE ON TRANSFORMER T1 FOR 115 OR 230 VOLT CONNECTION.

SD-DRAWING ISSUES AND T-DRAWING ISSUES AS FOLLOWS																				
SD-DRAWING ISSUES																				
1	2	3	4	5	6	7	7	8	9	10	10	11	11	11	12	12	13	13	13	14	15	15		
T-DRAWING ISSUES																				
1	2	3	4	5	5	6	7	7	8	9	10	11	12	13	14	15	16	17	18	18	19	20		

REVISION NOTES

ISSUE 2

ISSUE 3: ERRORS CORRECTED ON SH 3 FOS 02 AND 04 AND SH 2 POS 18,15

ISSUE 5: SLATE WIRE REMOVE FROM 103 NEG TO 302 TERM 15 TB7 DESIG. CHGD.

ISSUE 6: C4 REMOVED, LOCATION 03, SH 2.

ISSUE 7: F3 PT NO. AND FUSE HLR CHG'D ON SH 1 LOC 04, 4341-437 WAS 1185SAI 2484-537 WAS 245M

ISSUE 8: ADDED NOTES 2,3,4,5,6,11,12,13 AND 51. CORRECTED WIRING AT LOC 204, 205, AND 214 CORRECTED INSTALLERS NOTE 2, ADDED NOTE 7, AND CORRECTED TERMINATIONS OF TB7

ISSUE 9: F3 WAS A 150 AMP FUSE, LOC 104, CORRECTED TABLE "A" ON INSTALLERS SHEET AND TB1 WAS A 479LB TERM BLOCK, LOC 100. ADDED "Z" OPTION TO LOC 301.

ISSUE 10: CORR TABLE "A" INPUT AND OUTPUT LUG CAPACITY ON SHEET 4

ISSUE 11: R-F SUPPRESSION ADDED AT LOC 303, 304, 306-1.

ISSUE 12: 227 WK REPLACED BY 314 WK LOCATION 303

ISSUE 13: LOC 305 REMOVED.

ISSUE 14: 4826-035, SH 4, WAS "M" OPTION

ISSUE 15: W-BR-R WIRE AT F3A WAS W-R-BK IN ERROR

ISSUE 16: "V" OPTION OMITTED

ISSUE 17: SHEET 4 DELETED REPLACED BY PD

ISSUE 18: C6A, 7A PT NO. WAS 2715-285

ISSUE 19: L2 WAS 4411-516 LOC 300 WIRING CHANGED LOC 105, 300 AND 302 WAS T-1738-05

ISSUE 20: PT. NUMBERS LOC 103 AND 105 CORRECTED

2 M	11900 REDRAWN	9 10 64 9 10 64	A MUCHA RFF	AFT 9 23 64
3	12975	1-14-64		
4	13630	2-9-65		
5	13656	3-10-65		
6	14419	6-16-65		
7	14484	8-18-65	G SOBOTA 9-18-65	
8	15687	5-25-66 6-3-66		
9	15238	8-11-66 8-7-66		8-10-66
10	17164	12 21 66 12 21 66		
11	17345	1-17-67 1-18-67 1-19-67		
12	17386	3-13-67 3-24-67 3-27-67		3-27-67
13	17793	5-31-67 5-31-67		
14	18423	5-15-69 5-15-69		
15	19554	10-2-69 10-2-69		
16	19441	11-11-69 11-24-69		
17	19915	4-30-70 4-30-70		
18	1830545	2-17-71 2-18-71		
19	1832537	1-29-73 1-25-73 1-29-73		
20	1833537	10-18-73 10-18-73		10/17/73

T-1738-05

ISSUE

WIRING DIAGRAM

FLOTROL RECTIFIER

MODEL M100F50

SPEC 5451-001

DRAWN BY H WRIGHT	DATE 7-17-64
CHECKED BY	DATE
APPROVED BY R MAGNER	DATE 8-12-64
APPROVED BY J MITCHELL	DATE 8-12-64
R.C. NO. STANDARD	
T-5451-001	

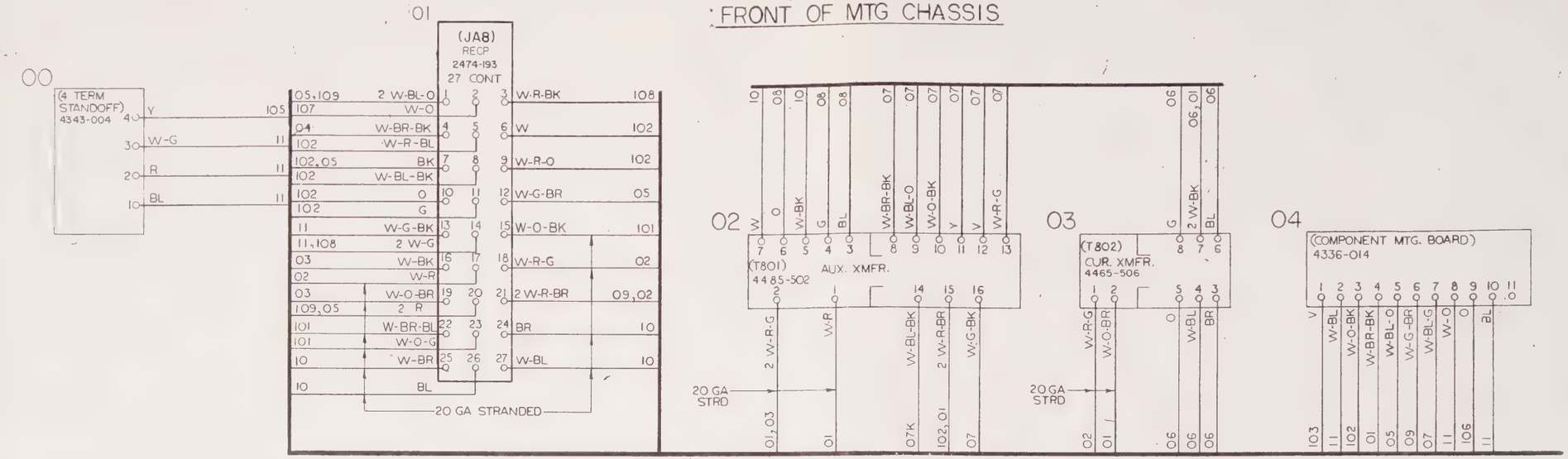
LORAIN PRODUCTS CORPORATION
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD., ST. THOMAS ONTARIO

DWG. SIZE D

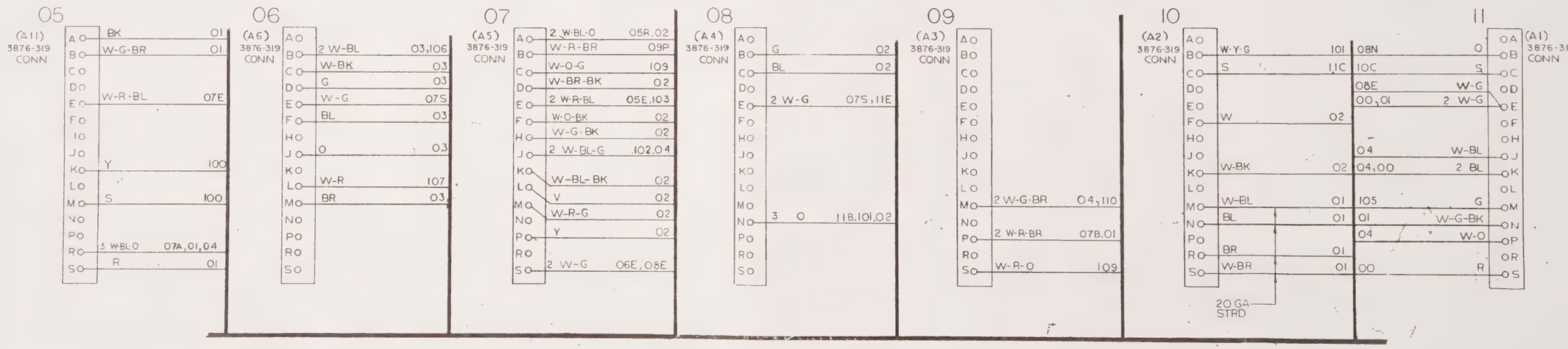
SHEET 1 OF 3

PRINTED IN U.S.A.

FRONT OF MTG CHASSIS



REAR OF MTG CHASSIS



PIGTAIL COMP. INFORMATION			
REF. DESIG.	L.P.C. PT. NO.	VALUE	LOCATION

ISSUE 13

WIRING DIAGRAM
CONTROL UNIT
4865-703

T-4865-703

LORAIN PRODUCTS CORPORATION

DWG SIZE D

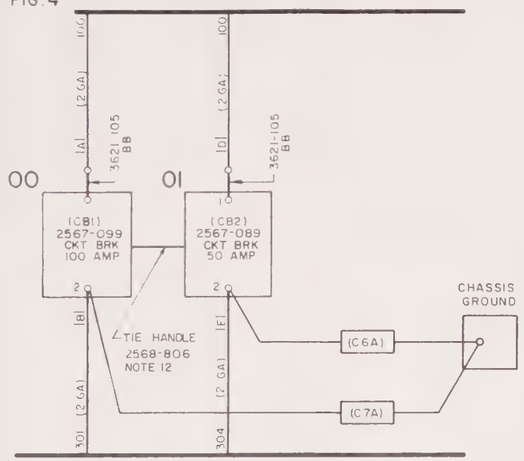
SHEET 2 OF 2

PRINTED IN U.S.A.

LP433

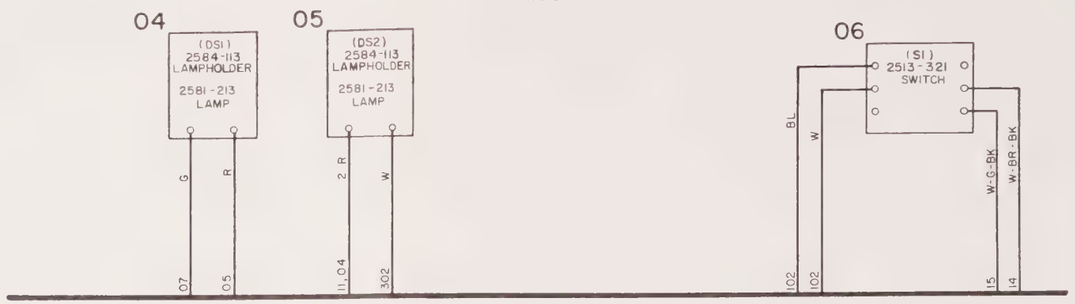
FIG. 4

CKT BKR PANEL (FRONT VIEW FIG. 4 ONLY)



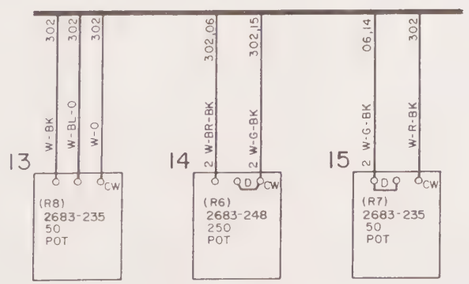
METER PANEL

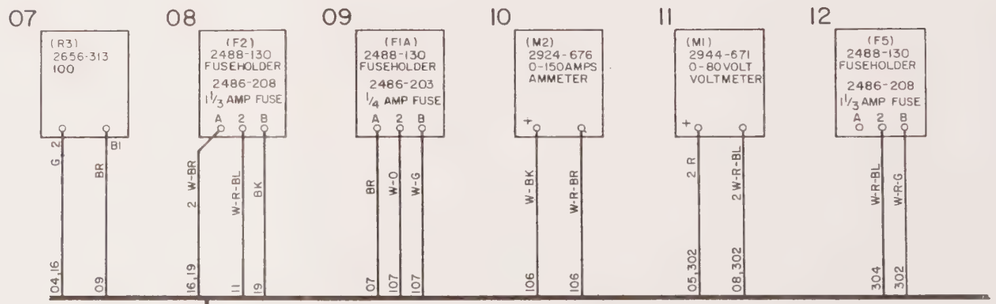
FIG. 5

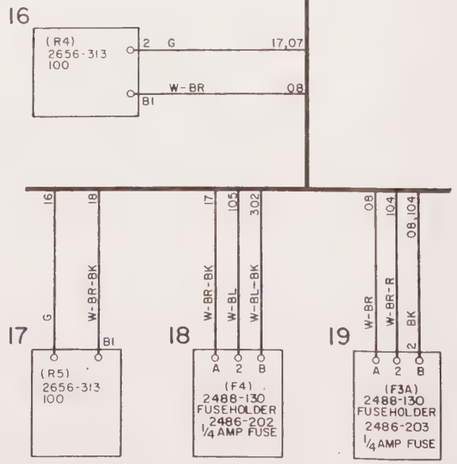


POT. PANEL

FIG. 6







PIGTAIL COMPONENT INFORMATION			
REF DESIG	L.P.C. PART NO.	VALUE	LOC
C6A,7A	2715-284	2	01

WIRING DIAGRAM
MODEL M100F50

T-5451-001

LORAIN PRODUCTS CORPORATION

SHEET 2 OF 3

FIG. 1
PART

FIG. 1
PART

FIG. 2
NOTE 8

00

01

02

03

04

06

06-1

07

08

09

10

11

12

13

14

15

16

(L1)
4431-037
CHOKE

4846-080
REMOTE CONT

(JA8)
2475-192
RECEP

(CR2-5)
4738-005
PWR
RECT
ASSY

(T1)
4466-009
POWER XMFR

(C1A)

(L1)
4431-508
CHOKE

(L4)
4411-033
CHOKE

(L3)
4532-507
SAT. REACTOR

3412-521
BUS BAR

(C2A)
2731-324
8500

(C2B)
2731-324
8500

(C2C)
2731-324
8500

(C2D)
2731-324
8500

(C2E)
2731-324
8500

(C2F)
2731-324
8500

(C2G)
2731-324
8500

(C2H)
2731-324
8500

(R2)

NOTE 9

2 TW

PIGTAIL COMPONENT INFORMATION

REF DESIG	LPC PT NO.		VALUE	LOC
R2	2652-335		1000	12
C1A	2715-262		0.5	04

WIRING DIAGRAM MODEL M100F50	T-5451-001
LORAIN PRODUCTS CORPORATION	SHEET 3 OF 3

Made in U.S.A. by
BEAVERITE
BEAVER FALLS, N.Y.
CA 20789
6 75

TD
85746